MAY 1958

Skyways

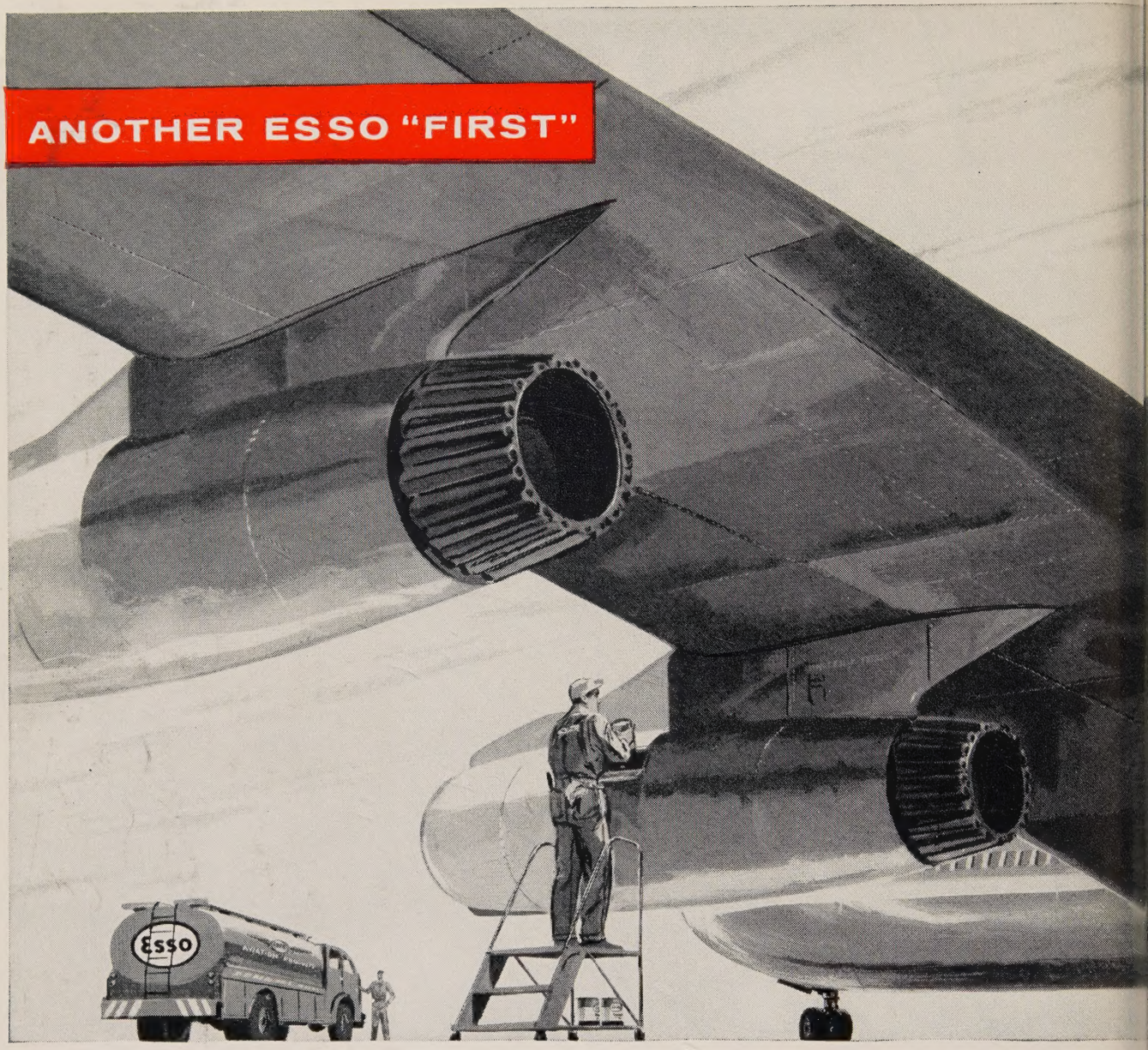
FOR BUSINESS

"Number, Please?"

Weather Wonderland

Airplanes, Money and Taxes

Official Publication National Business Aircraft Association



The first approved oils for jet age airlines

A new era in aviation is unfolding—turbo-jet airliners are joining our commercial airline routes. Esso is especially proud that its Turbo Oil 15 was the *first* to be approved for use in the new Pratt & Whitney jet engines . . . and that Esso Turbo Oil 35 was the *first* to be approved for the new Allison Turbo-prop engines.

A decade ago, Esso Research anticipated the need for a new synthetic lubricant for aircraft turbine engines. Working with American and British designers and manufacturers, Esso Turbo Oils 15 and 35 were developed. Because these synthetic lubricants were used by manufacturers of jet engines in the development and testing of these new engines, they are thoroughly time tested and performance proved.

Esso Turbo Oils 15 and 35 were the *first* turbo oils to be approved by manufacturers of the following commerci turbo-jet and turbo-prop engines:

TURBO OIL 15

Pratt & Whitney JT-3 and JT-4.....Boeing 707 • DC-

TURBO OIL 35

Allison 501.....Lockheed Electr

Rolls Royce Dart.....Vickers Viscount • Fairchild F-2

Rolls Royce Conway.....Boeing 707 • Douglas DC-

Rolls Royce Avon.....Sud-Aviation • Caravel
DeHavilland Comet I

Bristol Proteus 755 .....Bristol Britanni

You can depend on Esso—*first* in quality and in servic

TURBO OILS

Esso

ESSO RESEARCH works wonders with o

NBAA MEMBERSHIP

Information regarding regular or Associate Membership in the National Business Aircraft Association is readily secured by writing to the Executive Director and Secretary of NBAA at 344 Pennsylvania Building, Washington 4, D.C.

Membership in this non-profit and independent aviation organization is based on the recognition of business flying problems common to all users of aircraft for their business purposes and to those engaged in supporting the operation, servicing, equipment, and manufacture of business aircraft.

Among the fields in which NBAA is concerned are: improvements in airways and airports, better weather service, expansion in communications and air navigation facilities, higher standards of airport services, improved aircraft parts distribution, equitable tax rulings for business aircraft operations, greater recognition of the airplane as a necessary tool in modern business and industry, better air traffic control procedures, professional status for qualified business pilots, and aircraft designed to meet the special requirements of business flying.

National Business Aircraft Association
344 Pennsylvania Building
Washington 4, D. C.

June is not just for Brides!

June is also the month you will find in Skyways one of the most pertinent Round Tables we have ever published. Few subjects cause more concern to business pilots, owner-operators and fixed base people than—Ignition. The importance of ignition to operating success and economy has only been increased by the introduction of the new higher-powered engines in business aircraft.

This then, is the area of discussion of the very technically competent and delightfully vocal panelists headed up by moderator Bill Campbell of Scintilla Division, Bendix Aviation. The broad coverage of the panel's background and experience is indicated by the following:

Anderson, R. L., Champion Spark Plug Co.
Balogh, E. G., Titeflex Inc.
Church, J. R., AC Spark Plug Div., GM
Fisher, B. C., Neutronic Development Co.
Foster, R. P., Shell Oil Co.
Gale, B. H., Airwork Corp.
Gossett, A. E., AC Spark Plug
Haxby, L. P., Shell Oil Co.
Hudder, Clifford, Dallas Airmotive
Ingram, J. R., American Airmotive
Kovac, E. P., Lockheed Aircraft Service, International
Landi, P. J., Port of New York Authority
McClintock, Robert, Scintilla Div., Bendix
Mecca, V. J., Aircooled Motors
Musacchio, L. R., CAA
Ort, W. J., Swiflite Aircraft
Pomeroy, G. C., Swiflite Aircraft
Rhodes, J. L., Atlantic Aviation
Shimek, J. M., AC Spark Plug
Smith, L. C., Curtiss-Wright
Waker Jr., Hermann, Aerodex
Wild, Ted, Union Carbide Corp.

These experts, from manufacturer through service people to business pilot consumer, exhaustively cover such subjects as:

- Fuel Octane—its real meaning and uses
- Additives—how and why they work
- Plug fouling—causes and cures
- Heat ranges—importance to pilots
- Valve and piston burning—the real dope!
- Detonation—as distinguished from pre-ignition
- Plug cleaning—economy or risk?
- Ignition analyzers—value and best method
- Ignition systems—high and low tension, moisture problems

You won't want to miss this discussion. If you have ever wanted to "hanger fly" with those in the know, the Round Table is your chance to sit in.

PURE PLANE AND PIPER PERFECT

HE ALL-NEW

Comanche

WORLD'S MOST ADVANCED BUSINESS PLANE!

The eagerly-awaited Piper Comanche is now streaking across the nation's skyways. Sleek yet rugged, beautiful beyond compare, the Comanche is today's most advanced business plane.

This roomy, four-passenger, all-metal speed merchant boasts these advanced features... laminar-flow wing, jet-type single-piece stabilator and swept rudder ...so modern, so advanced, yet so docile and easy-to-fly that it sets a whole new concept in aircraft performance, safety, economy, utility.

The Comanche shares the Piper pedigree — latest in the line of world-proven, world-preferred airplanes now being used by thousands of business and professional men, farmers and ranchers. From the rugged Super Cub to the economical Tri-Pacer and the twin-engine Apache, there's a Piper plane that will add to your business — to your pleasure and recreation, too, See your Piper dealer or write for details, Dept. 5-K.

LEARN AS YOU TRAVEL · LEARN ON VACATION

If you are not now a pilot, Piper offers two practical suggestions to simplify learning. Through the famed Piper "Learn as You Travel" program you actually learn while making business trips. Or "Learn on Vacation", either with your local Piper dealer or at a summer resort, many of which have flying schools nearby. In two weeks' time you can be well on your way toward your license. See your Piper dealer for details.

PIPER AIRCRAFT CORPORATION • Lock Haven, Pennsylvania

HERE'S PIPER PERFECTION, TOO

PIPER TRI-PACER. Most popular low-cost, 4-place business plane. Combines most features to simplify flying—tricycle hydrasorb landing gear, simplified controls. Cruises well over 130 mph. Ideal for beginners and experts alike—safe, swift, economical. $8,395.

PIPER APACHE. World's most widely purchased twin-engine executive transport. 4 or 5-place capacity, over 170 mph cruise, up to 1,250-mile range. New reclining chairs, new sound-proofing, big, roomy cabin for luxury travel. Over 40 have flown the Atlantic. $34,990.

Piper also builds the famed Super Cub utility plane and PA-18-A, world's most widely used duster and sprayer.

MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

Circle No. 1 on Reader Service Card

MAY, 1958

Skyways FOR BUSINESS

The official publication of the National Business Aircraft Association

COVER: Previous award winners at Reading Aviation Meetings set high standards for successors. See cover explanation, page 44.

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The following publications are combined with SKYWAYS: Air News, Flying Sportsman and Airways Traveler. All rights to these names reserved by Henry Publishing Co.

Test your cross-country memory

Can you name this airport?

Clue: *It's one of the busiest in the East—a hub for executive aircraft.* (*answer below*)

Now check your aviation-oil memory: There are two vital reasons why Gulf oils are better for your engine. Remember them?

1. In addition to providing efficient, thorough lubrication, Gulf Aviation oils help keep engines *clean—and safe!*

2. Gulf-clean engines can go longer between overhauls, because there's less wear and tear on engine parts.

Choose either Gulfpride Aviation Oil Series D, the detergent oil, or Gulf Aircraft Engine Oil, the straight mineral oil—both keep your engine Gulf-clean and safe.

The Airport above is Westchester County Airport, located four miles northeast of White Plains, N. Y. It has three paved runways—the longest is 6,500 ft.

And here, as in airports from Maine to Texas, you'll find that complete and friendly Gulf Service waiting for you.

GULF

AVIATION PRODUCTS

Editorial

PUBLIC WORKS AND AVIATION

Inasmuch as every flight must begin and end on the ground, the importance of airports designed to meet increasing needs seems self-evident.

The present Congressional interest being shown for proposed Federally sponsored "public works" may present unusual opportunities for air-minded towns and cities to bring their airports up to standard and to prepare them to meet the challenge of the jet age.

Whether this Congressional sounding off is political thunder in an off-election year or an honest realization of growing national needs is somewhat beside the point. The academic question as to the propriety of encouraging Federal grants for local needs is equally beside the point. The fact is that those who make reasonable showings will probably get funds while those who fail to do so will help to pay the bill. In other words, "It's there for you, and if you don't take it, someone else will."

As an anti-recession move, Congress seems in the mood to make Federal money available for local public works projects. If it does, there is scarcely a town or city with a municipal airport that could not take advantage of such Federal grants to insure its own future transportation stability.

All too few of our airports have high speed turn-offs or sufficient runway lengths to accommodate civil jets which will be flying within a comparatively few months. Most airport loading and unloading ramps were built for DC-3 type of aircraft and for yesterday's volume of traffic. Tomorrow's air traffic will be greater and it will include a steadily increasing proportion of turbo props and turbo jets. All too few terminal facilities, including adequate automobile parking, proper and ample eating space, restrooms, baggage and other necessities, satisfactorily meet today's requirements. Dallas and St. Louis and Pittsburgh are the exception—not the rule.

Maybe 1958 will be *the* year when wide awake towns and cities can step up to Uncle Sam's bargain counter and buy modern airports at half the usual price. It seems a reasonable forecast that when the recession begins to pass and inevitable inflation becomes the dragon to be slain, it may prove to be a long, long time before public funds will be so easy to obtain.

Cities will do well to survey their airport needs, to prepare their plans and be ready to take advantage of what looks like a highly probable "golden opportunity."

COMMUNICATE ON

CHANNELS

WITH ARC's TYPE 210 TRANSCEIVER

The rapidly increasing volume of air traffic and the need for more precise traffic control has necessitated a tremendous increase in the number of assigned radio frequencies to carry on the necessary air-ground communications.

Only a few years ago pilots could operate with 10 or 20 channels. Later frequencies were increased to 80 or 90. Plans now call for 360 frequencies—enough to meet the need for years to come. In view of this channel increase, ARC now offers an all-channel, flight proven transmitter-receiver (Type 210 Transceiver) covering all 360 channels. The powerful 15 watts guarantees optimum distance range and the knifelike selectivity assures freedom from adjacent channel interference. Provision has been made for the selective use of single or double channel simplex whereby transmissions are made on a frequency 6 megacycles higher than the receiver frequency. There is no wait between receiving and transmitting for re-channeling.

This is ARC's latest contribution to air safety. Ask your dealer for a quotation to include a single or dual installation, along with other units of ARC equipment listed below.

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation BOONTON, N. J.

30 YEARS OF ACHIEVEMENT 1928 ARC 1958 IN AIRBORNE ELECTRONICS

OMNI/LOC RECEIVERS • MINIATURIZED AUTOMATIC DIRECTION FINDERS • COURSE DIRECTORS • LF RECEIVERS AND LOOP DIRECTION FINDERS
VHF AND VHF RECEIVERS AND TRANSMITTERS (5 TO 360 CHANNELS) • INTERPHONE AMPLIFIERS • HIGH POWERED CABIN AUDIO AMPLIFIERS
20-CHANNEL ISOLATION AMPLIFIERS • OMNIRANGE SIGNAL GENERATORS AND STANDARD COURSE CHECKERS • 900-2100 MC SIGNAL GENERATORS

Circle No. 15 on Reader Service Card

NBAA . . . Director's Notes

The long-awaited Administration's airways "user charge" legislation was brought one step nearer being introduced into Congress last month.

Secretary of Commerce Weeks, in a memorandum to Speaker Sam Rayburn, enclosed the draft of a bill "to provide revenue for the administration, operation, improvement and maintenance of the Federal airway system."

"Under the accompanying legislation," the Weeks' letter stated, the refund of 1 cent per gallon in aviation tax is eliminated and an additional tax of ½ cent per gallon is imposed effective July 1, 1958. Thereafter the additional tax on aviation gasoline is increased by ¾ cent per gallon each year beginning July 1, 1959. *Thus, the total tax on aviation gasoline will be increased to 3½ cents a gallon upon enactment of this legislation and will increase in annual increments of ¾ cent a gallon until a total of 6½ cents a gallon is reached.*

The Commerce Secretary pointed out that the total revenues from this aviation fuel tax program are estimated to yield $64,800,000 in fiscal year 1959 and to increase to $211,300,000 in fiscal year 1963.

* * *

The recent Mike Todd accident gave some airline representative a peculiar sales pitch to make to the officials of a large business organization.

Delicately hinting that perhaps the recent economic pattern had caused some companies to retrench in their business aircraft maintenance expenditures, the airline rep suggested that perhaps the airlines were, after all, the only solution to getting a business man from here to there safely.

Not only did the airline sales rep antagonize the business men—whose company has won several NBAA Safety Awards—but he also did the airline industry a great dis-service.

Any repetitions of this type of "sales" talk should be called to NBAA's attention. We'll see to it that the President of the airline involved gets the facts.

* * *

Headlines carried the story. "Airliner Dives To Miss Mid-Air Crash." Newspapers told how National Airlines DC-6B was snapped into a dive to miss "an oncoming twin-engined aircraft."

That's all the identification that was given, "A twin-engined aircraft."

Prompt investigation by CAB revealed that the other aircraft was—of all things—a National Air Lines Convair.

No headlines to tell that part of the story.

Just red faces. *Bill Lawton*

Suite 344

PHL S1 M2⊕ 1V SW 145/29/26→↑ 10/991/-yep, that was just about the weather and your Board of Directors came sliding in for the March Board Meeting. In spite of the weather, all but three were present. It was held at the Bellevue Stratford Hotel, site for NBAA's 11th Annual Meeting, Sept. 22-23-24, 1958. What a beautiful place! All kinds of space, good food and good service. Your Pres. Joseph B. Burns, The Fuller Brush Co.; Treas. John H. Winant, Sprague Electric Co.; E. M. Beattie, General Electric Co.; B. J. Bergesen, Ford Motor Co.; Walter C. Pague, ARMCO Steel Corp.; Ralph E. Piper, Monsanto Chemical Co.; C. F. Zimmerman, Continental Oil Co. were present. Harley D. Kysor, Aeronautical Consultants & Associates, was also present to meet with the Directors.

A meeting was also held with the Local Arrangements Committee for the annual confab. Bob Morrison, Insurance Company of North America Companies, chairman, really has his plans and "jobs" well thought out. Watch your mails for all material.

Stork Report from St. Louis—March 6, 1310 CST, Ralph E. Piper Productions rolled out a new model, 7 lbs. 10 ozs. Understand not yet ATR rated. Ralph Sr. will tutor once off oxygen.

MAILINGS: CAA's New Air Space Policy Places Great Challenge to NBAA and all Business Aviation; Military 'Non-Compliance' With Air Traffic Rules Curbed by CAB (CAR 57-16); Under Secretary of Commerce Outlines Airway User Charge Program; AD's on Vickers Viscount, Convair 240, Hartzell Propellers; CAA Appoints Air Traffic Supervisors in New York and Washington To Act as Liaison Between Air Traffic Control and Civilian Airways Users; Proposed Amendments to Part 60 of the CARs regarding New Rules of Operations on and in the Vicinity of Airports; CAA's General Aviation Survey—(NOTE: NBAA URGES ALL MEMBERS AND NON-MEMBERS TO COOPERATE AS PROMPTLY AND FULLY AS POSSIBLE WITH THE CAA IN THIS SURVEY); Memo to All Members Operating Lockheed 18-08 Aircraft with 1830-75 engines; Notice of Proposed Rule Making—Treasury Department—Reporting and Substantiation of Traveling and other Business Expenses of Employees; Two papers presented at the ALPA's Air Safety Forum—"CAA Training for Performance with Safety" and "TCA Ground School Training on Turbo Props"; Confidential Report concerning icing tests conducted on various "light-twin" aircraft; Coast and Geodetic Survey Radio Facility Chart; Special Report on What The Airways Modernization Board is, what is it doing? how is it composed, and what projects are now under way; Draft Release #58-5 Application of Minimum Performance Standards for Electronic Equipment to All Aircraft; Maintenance Bulletin #6; Confidential Report on Fatal Business Aircraft Accident at Grants, New Mexico.

Bill Lawton, Executive Director, has proven to us that he is still in his childhood. He had to take off a few days—*not* enjoying the three-day measles. He says his family is ready to kick him out, which proves he is much better.

NEW MEMBERS TO ADD TO NBAA's ROSTER: MEDICAL SERVICE ASSN. OF PENNA., Harrisburg, Pa., a non-profit medical service plan organization, operating Cessna 310-B. Donald T. Diller, Exec. V-P., is NBAA Rep., and George Burgoyne, Chief Pilot; R. J. REYNOLDS TOBACCO CO., Winston-Salem, N. C., mfgr. of tobacco products, operating Douglas DC-3 and Beech E-18-S. J. H. Drew, Chief Pilot, is NBAA Rep. and Bowman Gray, Pres., in charge of aviation activities; THE MEAD CORP., Dayton, O., paper mfgr. operating 2 Lockheed 18 Lodestars and 2 Beech D-18-S. Dale Shafer, Jr., Chief Pilot, is NBAA Rep. and N. S. Mead, Asst. to Pres., in charge of aviation activities; FEDERAL PAPER BOARD CO., INC., Bogota, N. J., mfgrs. of paper board and folding cartons, operating Riley Twin Navion and Twin Beech E-18-S. W. Wyburn, Consulting Eng., is NBAA Rep. and S. Lakatosh, Chief Pilot; EBCO MFG. CO., Columbus, O., mfgrs. of water coolers and dehumidifiers, operating Beech E-18, L. P. Benua, V-P and Chief Pilot is NBAA Rep.; COSBY-HODGES MILLING CO., Birmingham, Ala., operating Beech Bonanza G-35, J. C. Hodges, Jr., Exec. V-P, is NBAA Rep. and Chester L. Collins, Chief Pilot. (Regular Members); NAPIER ENGINES INC., Wash., D.C., fixed & rotary wing gas turbine engines, industrial & marine engines, rocket engines, operating a Beech Bonanza, Raymond J. Pflum, V-P, Sales, is NBAA Rep.—Chief Pilot and J. C. K. Shipp, Exec. V-P, in charge of aviation activities; BOEING AIRPLANE CO., Seattle, Wash., mfgr. of airframe and weapon systems, operating Boeing Model P-13-D and *Boeing Model 707*. Richard W. Taylor, Chief of Flight Test, Wichita, Kan., Div., NBAA Rep., and A. M. Johnston, Chief of

C. F. ZIMMERMAN, *head of Continental Oil Co. Aviation Dept., appointed to NBAA Board of Directors. With Continental since 1948, he was previously with CAA and served in USAF during WWII.*

NARCO SCORES ANOTHER IMPORTANT BREAKTHROUGH

ALL-CHANNEL

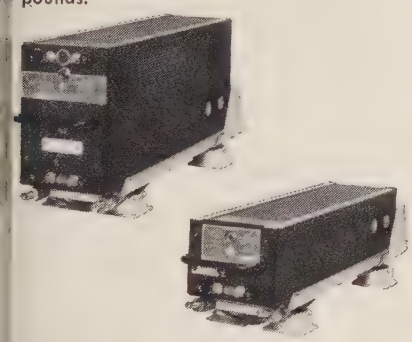
Sapphire

1016A

VHF RECEIVER-TRANSMITTER

with TRANSISTORIZED POWER SUPPLY

PPHIRE 1016A IS CAA TSO'd for eduled airline use. Unitized construc- n permits rapid disassembly and usual accessibility for servicing. Panel- unted control switches provide crystal trolled frequency selection for SCS, S, or random cross-channel operation. vision included for simultaneous chan- ing of glide slope receiver when used ILS. Unit weight 22 pounds; antenna pounds.



PPHIRE 1021 90-560 CHANNEL F RECEIVER. The receiver unit of the 16A is now offered as a separate all- annel receiver with transistorized wer supply in a short-height ½ ATR it. When coupled with VOR/LOC con- rter, permits rapid, precise crystal con- lled tuning to all NAV as well as OMM frequencies. Designed especially the remarkable "2½ Sapphire" sys- n, that gives unusual NAV/COMM xibility and rapid switching of func- ns to relieve cockpit load.

ANSISTORIZED POWER SUPPLY duces weight of 1016A by 4 pounds, ngth by 3½ inches, is nearly twice as icient as equivalent dynameter units. ith no moving parts, malfunction is vir- ally eliminated. Thoroughly proved in ousands of hours of flight and accele- ted laboratory testing.

MORE POWER, LIGHTER WEIGHT, SMALLER SIZE AND EVEN GREATER RELIABILITY have been engineered into this new Sapphire 1016A VHF communications unit. Thanks to the development by Narco of a revolutionary transistorized power supply, this latest addition to the popular Sapphire series of airline-quality equipment is more than ever the logical choice for airlines and executive aircraft users for an all-channel VHF communications unit.

The Sapphire 1016A provides you with a 90 to 360-channel transmitter with greatly increased power covering every channel with 50 kc spacing between 118 and 135.95 megacycles; and a 90 to 560-channel receiver covering every frequency from 108 to 135.95 megacycles, with the all-important advantage of permitting crystal controlled tuning to VOR/LOC navigation frequencies.

Sapphire 1016 series equipment is in scheduled airline use, has been re-specified for the U. S. Air Force's Cessna L-27's and is in use in hundreds of corporate aircraft.

You'll select the Sapphire 1016A because it provides you with all-channel transmission, all-channel reception both NAV and COMM, because it's years ahead in design and reliability, because it's CAA TSO'd for airline use and because it's sensibly priced. See your Narco dealer or write for new brochure.

narco

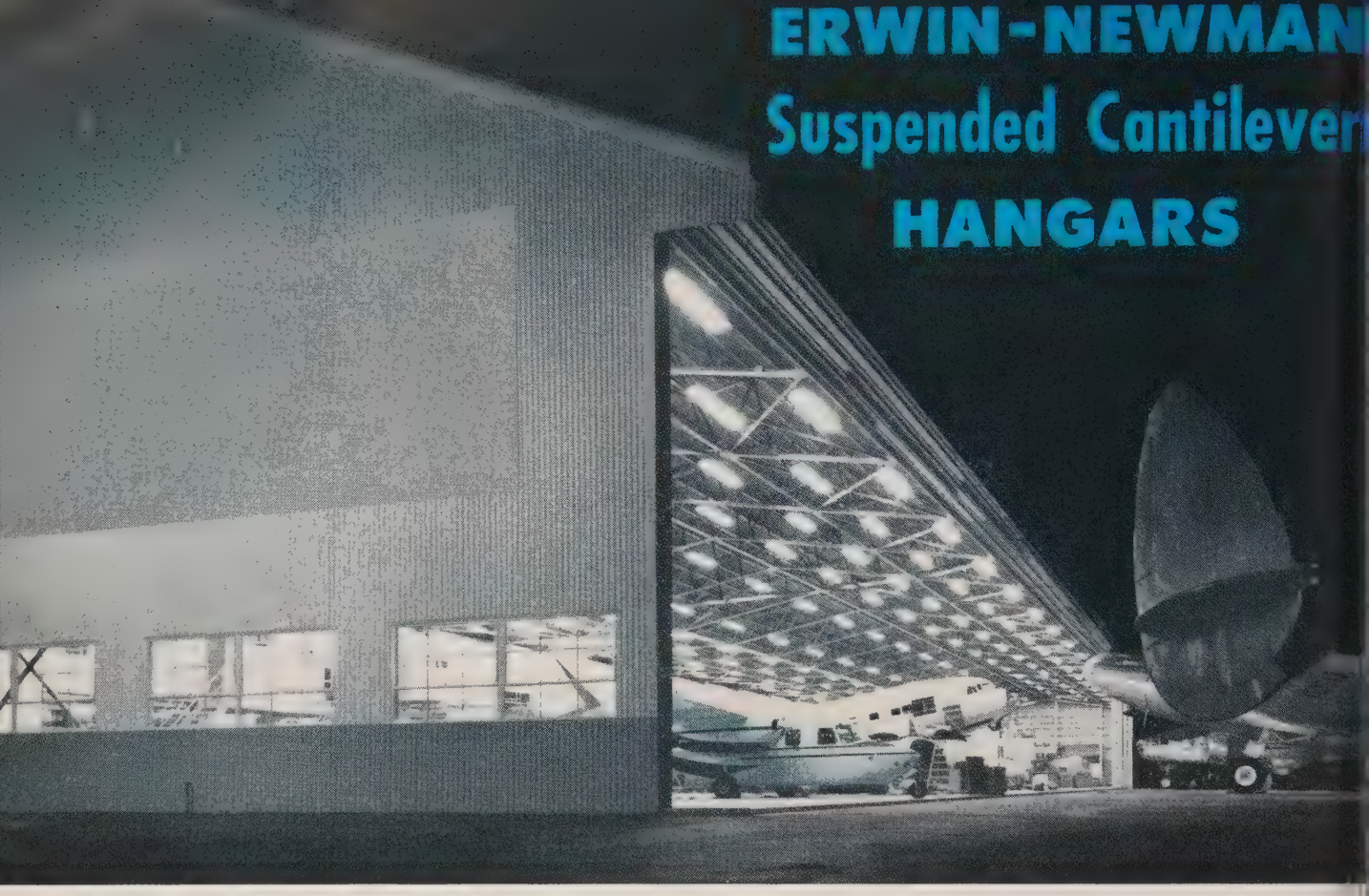
National Aeronautical Corporation, Fort Washington, Pennsylvania

MARK OF THE FINEST COMMUNICATIONS

Sapphire 1016A

90/360-CHANNEL TRANSMITTER
90/560-CHANNEL RECEIVER

Circle No. 4 on Reader Service Card



U. S. Patent No. 2,687,102

Night view of L. B. Smith's new overhaul and service hangar at International Airport, Miami, Florida. The clear span area is 360 feet long by 80 feet deep. Vertical clearance of feet. Supporting shop space means a total of 80,000 sq. ft. of aircraft maintenance are

Every square foot of hangar space— a square foot of usable space

Cantilever type construction means no obstructions of any nature to interrupt the clear span space, providing perfect housing for the maintenance and storage of aircraft. Enclosed space to the rear is spacious area for workshops, parts and office facilities.

This advance design is the result of 17 years experience in building several hundred hangars, of all sizes and types, which have withstood the most exacting load forces of every area—from the heaviest snow loads of the north and east, to the hurricane wind forces of the coast and the earthquake shock loads of the west.

Consult us before you build a hangar of any size, as this new modern cantilever type building can be constructed to your exact needs and in most cases will cost no more than older fixed span or limited clearance designs.

Call, write or wire us for information

Single Cantilever
Double Cantilever
Facing Cantilever

Erwin Newman Co.

Designers and Constructors

- Any Height
- Any Length
- Any Depth

Aviation Roundup

TYPE AND AMOUNT OF GENERAL AVIATION FLYING in 1957 to be bject of CAA survey. 7,500 aircraft owners to be queried for 12% sampling uses made during year. Findings to be published in booklet, "The Airplane Work for Business and Industry." Last published in 1955. Information to used in planning for air navigation aids and air traffic control services.

★ ★ ★

LOCKHEED JETSTAR SET RECORD with three-hour, 29-minute non-stop ght from Edwards AFB to Dobbins AFB for transport-type aircraft. Average uise speed of executive style plane was 557 mph. Plane awaiting Air Force aluation for production go-ahead. When military order contracted, Lockheed ll build commercial version. Skyways to do pilot's report soon.

★ ★ ★

JATO INSTALLATION by Southern California Aircraft Corp. approved CAA for DC-3. Aerojet's 15Ks-1000 is smokeless rocket engine, compenates for partial or complete loss of primary power by giving jet boost on deand. Reduces takeoff distance as much as 50% to overcome short runways, avy load conditions.

★ ★ ★

MYLORCRAFT'S ZEPHYR 500 IS NEW five-passenger, tricycle gear fiberas model. Plane has three doors, seamless leak-proof fiberglas gas tanks and terior designed by Arbib Co.

★ ★ ★

B-25 OWNERS, OPERATORS DESIRING POWER CHARTS for Wright 2600 engine may obtain charts from Skyways, 425 Fourth Ave., New York , N.Y. Charts provided by Air Force as result of demands for information. gh and low power figures included.

★ ★ ★

ELECTRONIC RADAR ECHO AUGMENTATION DEVICE (READ) imoves radar return under all conditions, for greater distances. Would enhance affic control of business planes and anti-collision radar of jet transports. eveloped by Temco Aircraft Corp., device is expected to improve effective nge of target returns up to five or eight times. Consists of cylinder of 3-in. ameter, flush-mounted antenna array, three cigaret-package size boxes.

★ ★ ★

NEW BRITISH CROP SPRAYER is two-seat Auster Workmaster designed specifications of Crop Culture Ltd., of Isle of Wight. Plane has 180 hp coming, variable pitch prop and is designed to carry 100 gallons of spray emical. Price, including spray gear, is less than $14,500.

★ ★ ★

GENERAL AVIATION DELIVERY RECORD set with 215 Cessna models mass flyaway. In lead was model 175, numbering 140. Total value, $3,250,-0. The 175's, dealers' planes, went to all parts of U.S., Canada, Alaska. (see ilot's Report, page 14)

★ ★ ★

DATELINES . . . May 4-7, California Assn. Airport Executives meeting, esno, Calif. . . . May 17, Armed Forces Day . . . May 16, Air Mail Pioneers th Anniversary Ball, Beverly Hilton Hotel, Beverly Hills, Calif. . . . May 16-, Miami-Havana Air Cruise sponsored by Florida Air Pilot's Assn.

Aviation Roundup

ADDISON AIRPORT OPERATIONS DOUBLED in six months, W. T. Overton, pres., announces. At Dallas, Tex., airport has temporary CAA approval for 24-hour IFR operations. Field exclusively business and personal flying.

★ ★ ★

EUROPEAN FIRM TO PRODUCE PERSONAL PLANE ready-to-fly or build-it-yourself kit. Avions Fairey S.A., Belgian subsidiary of British Fairey Aviation Co., calls the cheap, lightweight plane Tipsy Nipper. Cruise speed 65 mph with range of 187 miles. Powered by 30 hp Volkswagen engine, plane is single-place. Price, less than $3,000.

★ ★ ★

EXPANSION PROGRAM FOR AIR-GROUND RADIO-TELEPHONE service from the Chicago-Detroit area to Atlantic Coast outlined to FCC by American Tel. and Tel. on behalf of Bell System. Proposed additional stations, Pittsburgh, Washington, New York, will complete 200-mile wide corridor from present station sites at Chicago and Detroit areas. Corridor to cover areas of one-third of commercial air passenger travel in U.S. and more than one-fourth of all private flights, says AT&T. Filing explains that 12-month trial of service in Chicago-Detroit area, conducted by Michigan, Illinois Bell Telephone Co.'s, ends September and "has been extremely successful." (see story, page 13)

★ ★ ★

GENERAL ELECTRIC AND DEHAVILLAND ENGINE CO. approve extension of technical interchange to include production in England of GE's T58 small turboshaft engine. T58 is primarily helicopter powerplant of 1024 hp. Used on Sikorsky S-58, engine weighs 325 lbs.

★ ★ ★

SPARK PLUG REPLACEMENT DEVICE REVEALED by developer. Features no overheating, can handle low gravity fuels, does not involve precious metals. Tested in aircraft engine at 220 to 250 degrees cylinder head temp without overheating. Basic principle is controlled heat on ceramic nose. Production plans for early fall.

★ ★ ★

EXECUTIVE AND UTILITY AIRCRAFT SHIPPED IN 1957 total 6,118 one to ten-place models, by nine U.S. manufacturers, Aircraft Industries Assn reports. Value of shipment was $99,652,000. General aircraft offers profitable opportunity which increasing numbers of businessmen, industries, farmers and ranchers are accepting, says AIA.

★ ★ ★

NBAA MEMBER SERVES AIRLINES AT SAN FRANCISCO International Airport. Bay Aviation Services Co., Oakland Airmotive subsidiary, named to handle fueling for Japan Air Lines. Earlier, Bay Aviation awarded contract by Qantas Airways Ltd. and BOAC. Bay Aviation was established summer, 1956.

★ ★ ★

NEW YORK AIRWAYS–AIRWAYS MODERNIZATION BOARD SIGN CONTRACT for operational evaluation of Bendix-Decca Navigator System. Provides for installation of System in each of NYA's five 15-passenger Vertols. Each copter to have pictorial cockpit presentation, an integral part of special panel. Ground stations to be operated by Pacific Div., Bendix.

AIR YOUR VIEWS

Dear Editor,

Thank you for your letter in which you take into consideration the use of plain water for extinguishing clothing fires. . . .

Carbon dioxide will cause suffocation if a person is confined in an atmosphere containing carbon dioxide in sufficient quantity to extinguish a fire. Carbon dioxide forms dry ice as it is projected from a portable extinguisher horn. This carbon dioxide snow or particles of dry ice have a temperature of —110 F and, if handled by an individual, will cause frost bite.

When a person's clothing is on fire, the use of the carbon dioxide extinguisher will be of such a short duration that it is inconceivable that a person could be suffocated. It is quite possible but not probable that a local frost bite condition would develop; but what is more important, extinguishing the fire and causing a possible frost bite or allowing the person to burn to death?

Donald A. Diehl
The Fyr-Fyter Co.

Dear Mr. Childerhose,

I was very much interested to read in February Canadian Reports the procedures outlined for the use of the SARAH unit. I would greatly appreciate it if you would let me know where it can be purchased. Does it operate on a standard homing or emergency frequency. If so, we should certainly carry one in the aircraft.

Paul K. Heim
Richmond Arco Univ. Center, Inc.

Dear Mr. Heim,

The SARAH equipment mentioned was sold in Canada by Canadian Aviation Electronics Ltd. It may now be sold by Field Aviation Co. Ltd., Oshawa, Ontario.

SARAH is a British development, and may not be in use anywhere in the U.S. Since it requires a special receiver for the search aircraft, it might be of little use to you unless you managed to dead stick your aircraft into Canada.

Operating frequencies: I think these are variable only on the automatic or beacon-transmitting function. Voice communication is on 121.5 mcs, International Distress freq.

The cost of these SARAH transmitters in Canada is about $200; perhaps less. They are very effective, and very easy to operate. The battery must be replaced every 3 or 4 months although a longer-life battery is in the development stages and should be available soon, good for 1 year minimum life.

If your flying operations do extend into Canada, I would recommend your purchase of this device. Few Americans really appreciate just how much wilderness we have up here.

R. J. Childerhose
Canadian Editor
See Navicom section page 54 "New . . . Rescue Radio Beacon . . . ")

Dear Mr. Lawton,

I have read "NBAA. . . . Director's Notes" from the February issue of SKYWAYS suggesting that (amateur rocketeering) activities be confined to air bases, restricted areas, missile ranges, testing and proving grounds.

I consider the suggestion an excellent one, and believe that some progress in that direction is already being made.

A. S. Mike Monroney, Okla.
U. S. Senate

Dear sir,

We are writing you in regard to the article published in the May 1957 issue of Skyways entitled: "Further details—ATC/TWA dispute." We missed the last of it.

Could you refer us to the issue containing further discussion about this?

We are very happy with your magazine, but not this type of flying. Seems there was much more horsepower than horsesense with such little control.

J. Cope
R. Strikeleather
Walnut Ridge, Ark.

(Follow up of ATC/TWA article was in issue of July '57, page 24, "ATR Suspension Upheld for Mid-Air Duel."—Ed.)

Dear Editor,

Thank you for the fine synopsis of my NATA address which appears in the January issue of Skyways. It is a compliment that you thought enough of my comments to reproduce them.

As always I find Skyways good reading.

Sincerely,
Joseph T. Geuting, Jr.
Manager, Utility Airplane Council, AIA

Dear Torch Lewis,

Just read your "Moon Over Miami" piece in the April Skyways, and have the perfect solution to all your Miami problems.

Land at Pompano.

C. S. Weaks
Remmert-Werner, Inc.

(Dear Stace,

This is nothing but a blatant, bold-faced plug for Remmert-Werner, but we'll try it.
Torch)

(Continued on page 55)

Greenhouse Patter

By "Torch" Lewis

Bananas and airplane crashes usually come in bunches—bananas six to the package, airplanes three. The latest series is the Mike Todd affair, the DC-7 out of Miami and the Mooney MK20 in the ocean off Ft. Lauderdale.

Not enough evidences are in to draw accurate conclusions on the Lodestar or the DC-7. The only observation to make concerning the DC-7 is that we all sincerely hope that the human carrion who swept in looting purses, wallets and other valuables minutes after the crash are dealt with summarily and severely.

The Mooney simply ran out of gas two miles off the coast at 1:30 in the morning with SIX persons aboard and no flotation equipment. No one was injured in the landing. They all got out, and FIVE persons drowned because they didn't have Mae Wests. This senseless slaughter of five human beings does not deserve comment save that the naive dead died innocently and that the plane, being flown without the owner's sanction, was not at fault.

There has been so much discussion and speculation over the Mike Todd et al tragedy in New Mexico and so many conflicting and absolutely groundless rumors emanating from this incident that I felt compelled to track them down and present them, letting the chips fall where they may.

First of all, both pilots possessed ATR's, both were familiar with the Lodestar. The copilot was newer to the operation having replaced a capable man who was light on Lodestar experience. The ship was well maintained and contrary to popular opinion, which I confess I had shared, did have deicer boots installed and assumed to be working.

The last report from Captain Verner was that he had climbed out of icing at 11,000′ and was between layers at 13,000′. 65 miles to the east was Albuquerque sporting high broken clouds, 30 mile visibility. If Verner had been in heavy icing it would be reasonable to believe that he would have requested approach clearance to ABQ or emergency descent to the aux field at Grants directly below.

The area of wreckage indicates that they went straight in, and that the plane was completely intact at the moment of impact. The right engine had been feathered but a lightly loaded Lodestar with 1820-56 engines is in no serious difficulty on one engine, even at 13,000′. Even adding an ice load a Lodestar wouldn't come down like it was poleaxed.

The engine stoppage is a clue, but the whole tragedy remains an almost unsolvable enigma being given an undeserved black eye through erroneous and distorted information.

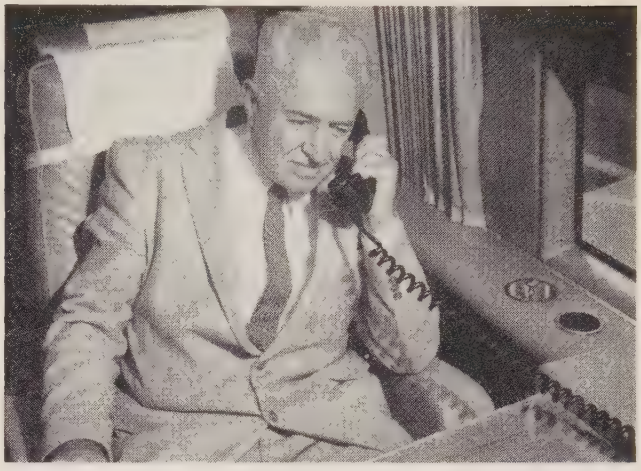
Personally, I think that a pilot accustomed to daytime operation cannot

(Continued on page 55)

"NUMBER, PLEASE?"

Progress Report—Air-Ground Public Telephone Service

RECEIVING PHONE CALL FROM PLANE, *O. G. Smith, chief engineer, Illinois Telephone, chats in one of first air-to-ground telephone conversations. System is undergoing a one year trial.*



PHONING FROM GENERAL MOTORS DC-3, *K. V. Glentzer, radio and special services engineer, Illinois Bell Telephone Co., makes one of first calls over new air-to-ground system.*

"You are supposed to be flying to the coast! Don't tell me you are calling from the air!"

One of the difficulties executives who are using the new air-ground public telephone service have, is to convince people on the ground that they are really calling from the air.

Public telephone service for airborne business and airline passengers which was initiated Sept. 15, 1957, is now well into the year-long service test over the Chicago and Detroit areas and growing fast.

There are 20 planes using the system; four airline aircraft, a CAA plane and the rest are personal business aircraft such as Sears, Roebuck & Co., General Motors, Ford Motor Co., Square-D Switch Co., Bendix, Gram-Aire, Chrysler Corp., etc.

Passengers can be connected to any office or home phone anywhere while flying over the Chicago and Detroit areas. An average of about 200 calls monthly are being made and increasing.

"Hello—Tower? This is Douglas - - -, over X-RAY Intersection at :42 at 5000. We were unable to reach you on Approach Control VHF, so we're calling via Telco. How about further clearance?"

Yes, it has happened!

In other instances, an inbound business crew called for a passenger while still outside VHF range and asked that an airline connection be held for their impending arrival.

More often, calls are made to arrange or rearrange business appointments, make hotel and transportation reservations, conduct actual urgent business that couldn't wait on an ATC-delayed arrival, and, of course, to rearrange a personal or business rendezvous at the airport clobbered by unanticipated wind or weather delays. This service which used to be permitted over CAA circuits in this eventuality is now discouraged because of the traffic increase.

Radiotelephone units aboard the planes are connected to the nationwide Telco system via ground stations operated by Illinois Bell and Michigan Bell Telephone Co. Special "aviation operators" make the connection.

In making an air-ground call, a plane passenger presses a push-talk button on his airborne phone. This sends a signal to a base station and thence to a special aviation switchboard operator. Upon reaching the operator, the passenger gives her the number he wishes and the connection is made. The procedure is reversed for ground-to-air service if desired.

Illinois Bell's radio antenna is on a mast already used for vehicular phone service, and is located atop the 550-ft Field Bldg. in the downtown Chicago Loop. Because of the height, the calling radius to the aircraft is about 200 miles.

The Detroit station at Dixmoor, Mich., outside Detroit is about 70 ft high, and the air-range there is about 100 miles.

The companies are using temporarily two radio frequencies on an unused vehicular mobile telephone service. Since only one channel is being used for the experiment, only one connection may be completed at one time through each station.

The airborne equipment in the initial test service consists of small, light-weight sets manufactured by various electronics manufacturers.

Rates for the one-year trial service range between $1.50 and $4.25 per three-minute call, depending on the location of the plane and the other party when the call is made.

The experimental service was authorized in April, 1957, by the FCC for a one-year period.

pilot's report

175 HORSES FOR THE CESSNA 175

by Lindy Boyes

Are you one of those pilots who has wished the Cessna 170 or 172 had "just a little more power" to speed up cross-country flying?

The company has come up with the answer in the form of the model 175, powered by 175 hp Continental. Almost appearing to be the 172's twin, the newer model features a "power-geared" engine with "floating cowl suspension." The former has been used in aircraft over the past 20 years, but this is Cessna's first application in its single-engine line. The latter is relatively new, but is utilized on the 310. Application to the 175 was the result of a cracked engine mount on an early model. Cause was determined to be vibration. The "floating" effect is achieved by attaching the cowl to a ring which is fastened to the four engine mounting points connecting to rubber shock mounts which in turn are secured to the engine mounts. This permits the cowl to "float" freely over the edge of the firewall.

All this was explained to me by Charlie Porter, Cessna's representative at White Plains, N. Y. He had flown to Flushing Airport from where I was to make my evaluation flight of the new business-personal plane for this report to Skyways' readers.

In profile the 175 has a fatter nose than the 172 because of the larger engine. Convenient placement of the battery in the fuselage behind the cabin section makes it accessible from a standing position.

The now familiar comfortable interior—seat-wise, color-wise, space-wise—of the recent Cessna single-engine models featuring the "Land-O-Matic" gear, has one new distinct feature in the 175, a new instrument panel arrangement.

Flight instruments are grouped in front of the pilot. Switches, tachometer and starter in mid-panel. Fuel gauges and radio are in front of the right seat. There is ample space for additional instruments or radio equipment. I was impressed by the ease of visibility of the bottom row of instrument space in front of the pilot; it tilts forward.

Green area on the "tach" takes some mental adjusting. It spreads from 2400 rpm to 3200 rpm . . . more like some helicopters I know. Reason behind this, of course, is the reduction gear which means that at an indicated 3200 rpm the propeller is turning 2400 rpm, a reduction ratio of .75 to 1.

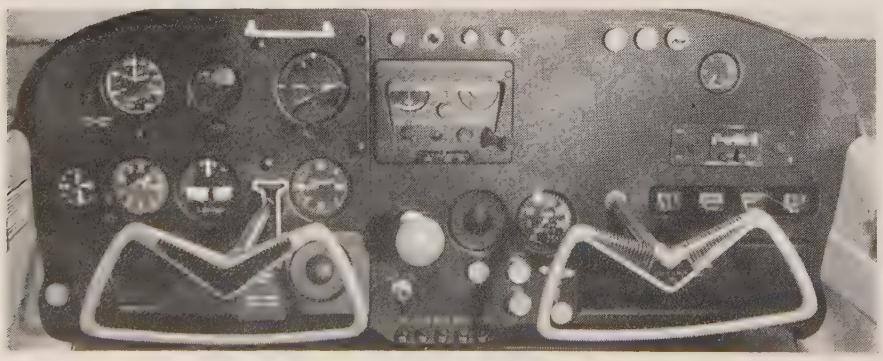
First sound of the engine is good. The increased horse power is noticeable immediately. The minimized vibration resulting from the "floating cowl" reduces cabin noise level.

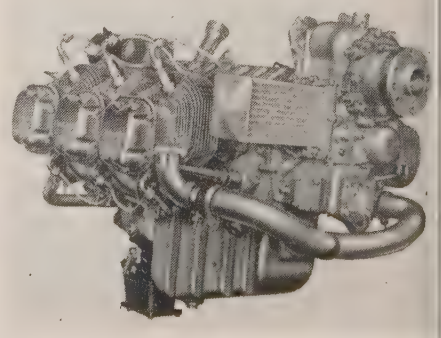
Maintaining full throttle after takeoff, I held 80 mph and climbed to 10,000 feet doing a variety of turns and straight climb on the way. It took 15 minutes. Almost had the feeling of flying the 180. In level flight over Long Island the plane "trued out" at 153 mph.

Power off with carburetor heat full on, the engine sort of chugged. I had noticed on the ground engine run-up that rpm dropped about 300 in a hurry with carburetor heat on. (It picked up just as quickly when turned off.) Porter explained that this is caused by the much larger hot air intake. A little power with full heat and the "chugging" ceased. I tried a couple of power-off stalls with level attitude recovery by use of full power. Craft stalls neatly, positively. Slow flight at 60 mph permitted easy turns in both directions with good, stable feeling. Slow flight at something under 4[illegible] mph resulted in a stall with the right wing low. Second try after helpful hints from Porter, and the 175 held her nose high. But I didn't try any turns.

Letting-down on the return flight to Flushing, IAS was 140 mph at about 300 fpm. It was "hands off" type flying weather—smooth. A "Land-O-Matic" touchdown was accomplished, and the hour-long flight ended.

Pertinent data includes a price tag of $10,995 at the factory. The engine uses 80 octane fuel. Factory claims 4.3[illegible] hours endurance utilizing 70% power at 10,000 feet which gives cruising speed of 139 mph and range of 595 miles. Sea level rate of climb is 850 fpm; service ceiling, 15,900 feet. Gross weight is 2,350 lbs; empty weight, 1,312 lbs. Fuel capacity is 52 gallons. Range is based on 43 gallons usable. Other nine gallons are usable in level flight only. Propeller is fixed pitch metal McCauley, FC8467. The geared engine permits use of the 84-inch diameter prop which has a 12-inch ground clearance.





PLANE FAX

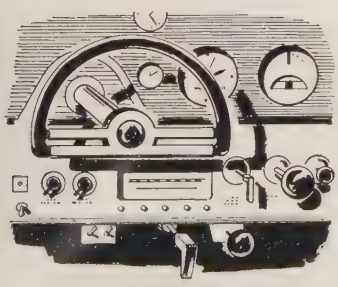
by STANDARD OIL COMPANY OF CALIFORNIA

Planting trout by air into Cascade lakes

"Bombing" mountain lakes with fingerling trout, Sam Whitney has revolutionized Oregon's fish-stocking program. In just one month he "plants" more than 350 lakes by flying 150 feet above the water — high enough for the fish to lose their forward motion before they hit. Pack trains previously spent all summer stocking only 60 lakes.

"Dropping toward those small lakes in timber country can be a lot of fun," says Mr. Whitney, "as long as I know I have enough power to get up and out again. That's why I use Chevron Aviation Gasoline — it *always* gives me the extra power I need, without a miss. It never fouls my plugs, either. There's no better gas made.

"I know RPM Aviation Oil is the best 'engine insurance' I can get. It keeps my planes running smooth and free for hundreds of extra hours, with never a stuck valve or ring. In fact, when a customer comes to my base at Newberg, Oregon, with that trouble, I usually cure it just by flushing out his engine with 'RPM'."



TIP OF THE MONTH

It's smart to check all controls every time someone changes seats — it's easy to bump a vital switch or lever.

We take better care of your plane

CHEVRON AVIATION GASOLINE

AVIATION OILS RPM

T.M.'S "RPM," "CHEVRON," "PLANE FAX," REG. U. S. PAT. OFF.

Another in a series on commercial aircraft operations . . . and why these operators, like the major airlines, prefer Champion Spark Plugs. Noted aviation authority reports on Allied Helicopter Service . . .

Uncommon Endurance

by **HERB FISHER**—*international aviation authority, veteran test pilot, author*

"Surveying, lifting machinery . . . bucking winds to hot, thin heights . . ."

The romance of the whirlybird is a dead duck so far as Allied Helicopter Service is concerned. Allied *works* its unglamourous craft—murderously.

Headquartered at Tulsa, this unusual eight-year-old "rugged-duty outfit" hires out on a world-wide basis—spraying, exploring, patrolling, surveying, hauling . . . frequently under almost unbelievably grueling conditions, jungle to Arctic.

As Roy B. David, Allied's President, told me: "For men, it's all *work*. For machines, it's just plain hell."

Herbert O. Fisher

A colorful Oklahoma attorney whose work in corporate aviation law led him to the founding of Allied, David speaks with undisguised admiration for his toiling helicopters:

"These are no dolled-up glamour birds. We tear them down, here in our shops—airframe to engine—down to the last nut and bolt. We custom-overhaul them from the ground up. We weld and innovate. We don't care how pretty they are. They've just got to be tough, beefed up to withstand terrific punishment.

"No engine goes in service until we've made it precision-perfect—able to take almost incredible overwork despite abrasive sand and humidity, subzero weather and hot, thin altitudes. That's why Champion Spark Plugs are so vitally important to us: *They insure dependability* of a good engine. Without a 100% dependable engine, you can wash out in short order in an operational grind like this."

SPRAYING, SEEDING

Allied's main operation now is crop and reclamation spraying—herbicides on pasture lands, forests, rights-of-way, canals and ditches, rice fields; insecticides on croplands, forests, cities—plus seeding of broadcast crops, pine forests, strip mines, grazing lands.

On the foreign front, Allied is spraying 50,000 acres of bananas per *month* in Guatemalan river-bottom. Eight 'copters plus pilot and mechanic crews are on the job. This operation represents a 5-million-dollar-a-year crop savings to banana growers, David said.

Rugged duty, for certain: With skids ofttimes touching banana leaves—darting in and out of jungle-bordered corners, day after day—each second of flight is critical. There can be no margin for error. Pilot, airframe and engine must be superbly *fit*:

"We pull our custom-tailored engines every 600 hours, clean spark plugs every 50," David said. "And fortunately for us, we can buy Champions in Guatemala City—as well as nearly any place else in the world.

"Helicopters, you know, work plugs much harder than do other aircraft, subject them to much severer operating conditions. When you consider that helicopter engines operate *constantly* at the high RPM that airplanes use only on takeoff — which means high electrode erosion and shorter plug life—this

Allied on oil survey . . . swamp near Morgan City, La.

should floor you as it has us:

"*Our plug life is 600 hours.*"

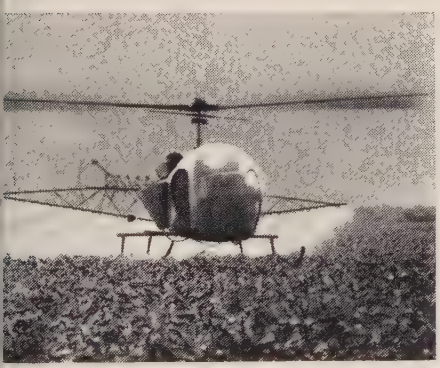
One of Allied's more spectacular home-front projects involves spraying 1,000,000 acres of mesquite in Texas and dense scrub in Oklahoma: "Remove that worthless mat and you'll have the best cattle country and farmland in the U.S.," reclamation experts had predicted.

"Carving farm and rangeland out of backcountry like that really gives our grasshoppers a workout," David told me. "And already a lot of that 'worthless mat' is cow-belly-deep in grass!"

On an "ordinary" herbicide and insecticide spraying job, I watched Allied 'copters clipping along the ground and shuddered. I watched them snuggle into corners of fields—right up to border vegetation and obstructions—then pivot sharply "at the last minute," spraying again, without drift, a return swath in three to five seconds. They'd land anywhere, anytime—taking on fuel and chemical in mere minutes. Then off again.

"That's real precision work," David said pridefully. "It's more than teamwork. Like the old cowhand and his horse, the helicopter pilot and his machine *must* operate as *one unit*. The man out there, Herb, is a *part* of his 'copter—and that engine is his heart. He wants it strong—fired to life by *dependable* spark plugs."

Allied has sprayed several thousand



"Spraying, skids raking foliage . . ."

miles of power line and railroad right-of-way from Texas to Illinois. A special controlled width device—developed by Ozzie York, Vice President-Maintenance and former RAF pilot—cuts a swath without harming valuable crops or timber to either side.

In Allied's vast forest and range reclamation projects, this equipment is used with chemicals that kill certain plant species without harming desirable vegetation: pine stands aloof and healthy, for example, while other trees and underbrush die.

SURVEYING

From Arizona to Alaska and Iceland, Allied has done government surveying and transplanting of heavy equipment and manpower where it's ofttimes impossible by other means.

In Iceland, Allied operated with the U.S. Army Map Service.

In Government uranium exploration in Alaska, Allied had to heat motor oil before it could be used: "I swear, when it's 40 below up there, I think we must have sometimes drunk the oil and poured hot coffee in the 'copters, so *un*romantic was *that* duty!" David said.

With the U.S. Geological Survey and Atomic Energy Commission, Allied 'copters invaded 17,000 square miles of some of the most inaccessible wilderness on earth—the Four Corners country of Utah, Arizona, Colorado and New Mexico. Here, Allied helicopters bucked wind currents from gorge bottom to heights where hot, thin air made hovering nearly impossible. They shuttled surveyors to hundreds of these pinnacles—averaging 8 to 10 miles apart — so they'd have abundant triangulation points for mapping 20- to 40-foot contour intervals. They lugged up machinery, explosives and timbers, and, between tasks—to test thermodensity lift—they'd haul boulders several thousand feet up from the canyon floors.

In Alaskan Geological Survey operations, 'copters pitched among icy mountains to cut field costs for mile-to-inch mapping from $25 a square mile to less than $8.

OIL EXPLORATION

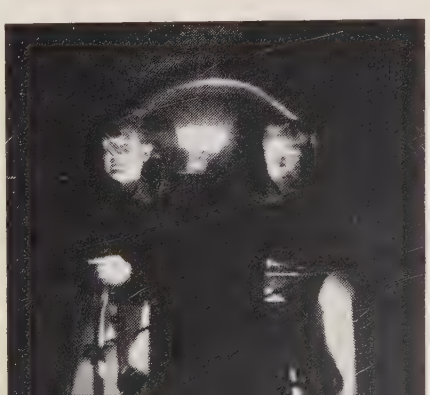
Allied has operated under contract to major oil companies from South American jungles through Louisiana swamps to the Canadian Rockies and Alaska.

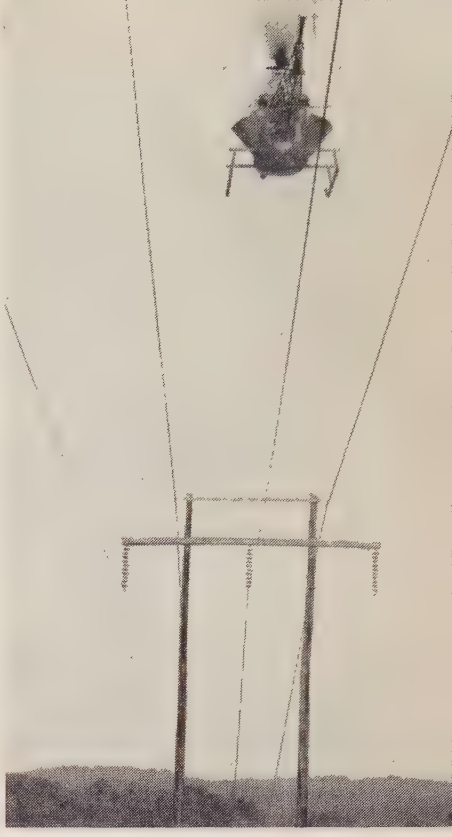
Before first wells came in on now productive southwestern United States test sites, Allied whirlybirds were scouting the badlands for Gulf Oil. Explosives used in refraction shooting were shuttled quickly from "shot station" to "shot station" in this almost impossible country. Such treks previously took 100 men, each packing one case of dynamite, three days.

In Alaska and the Canadian Northwest, Allied's "grasshoppers" opened previously inaccessible areas for Phillips Petroleum, hauling supplies as well as flying geological survey missions.

In South America, Allied packed instruments, drills, explosives and camp supplies through dense jungles—covering in 45 minutes what had taken natives six

Night patrol . . . (r/l) Roy B. David, Allied President; Osvil York, V.P.-Maintenance





"Hustling along hazardous hot-wire trails . . ."

days to traverse. Here, Champions protected against hazardous flashover caused by hot, moist operating conditions.

In our own Gulf States, Allied air-lifted to isolated swamps everything from drilling apparatus to explosives. Seismograph crews didn't even get wet feet: the pontooned 'copters dragged surveyor chains, held the stake and flew sideways, up, down and backwards at the surveyor's signal.

PATROLLING

"Rugged" characterizes Allied's patrol duty, too.

With the Tennessee Valley Authority, for example, Allied 'copters skittered along 8,000 miles of high-voltage transmission line for 3½ years for a close check of line or insulator damage—impracticable by ground inspection.

On frost control projects in Oklahoma and Kansas, Allied flew low along telephone-telegraph lines so powerful rotor downdraft would jar accumulated ice off wires threatening to snap!

"Whether hopping about a pocked desert or combing bugs out of the jungles, it's *rugged duty* that you have to live with every day to really comprehend," David said. "It takes quite a crew, quite a craft, quite an engine—and, quite a spark plug. You can't buy a more serviceable, dependable spark plug than Champion. *We know.* We've got the operation to *prove* it—as I used to say in the courtroom—'beyond any shadow of a doubt.'"

CHAMPION SPARK PLUG CO.
TOLEDO 1, OHIO

Weather Wonderland

by

Richard W. Groux

Assistant to the Executive Director, NBAA

Congressmen agitated by mid-air collisions are today berating both CAA and CAB over air safety matters. Yet, these same Congressmen in the past ten years have done little to help air safety as it relates to weather.

Here is the dismal picture:

- The Weather Bureau offers less aviation service today than it did ten years ago. During this period there has been a loss of 85 weather stations and 279 weather service employees.
- During this same ten-year period aircraft operations have more than doubled. CAA fix postings have quadrupled. Instrument approaches have increased sixfold.
- The total number of full time Weather Bureau employees is 4,238. During 1957, the CAA increased their air traffic control staff alone by 2,400 employees.

Each week NBAA receives reports of reduced, removed or suspended aviation weather service from all parts of the country. The problem has become so acute and widespread that a thorough investigation of the cause and circumstances should be immediately undertaken by the Congress.

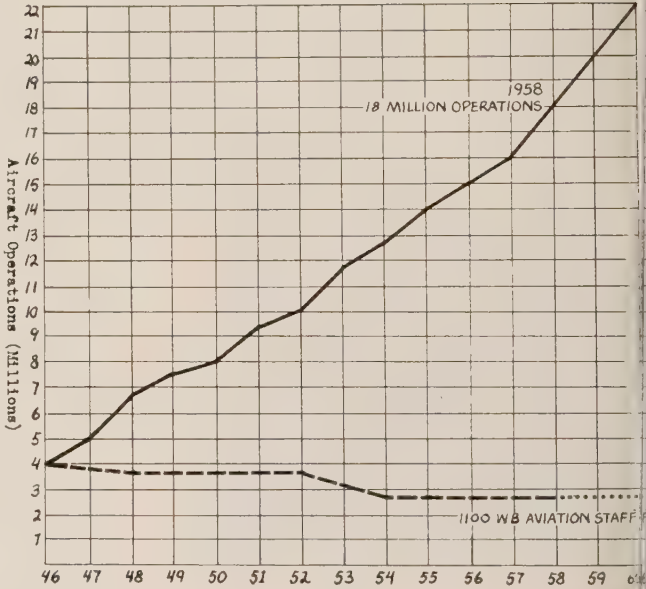
Finance Fiasco

The extent to which any government agency can do its job depends largely on the financial support which Congress gives to its programs. Last year, FY 1958, *all* of the funds which were cut from the Weather Bureau's budget by the Congress were to have gone for aviation purposes.

This year's Weather Bureau budget request contains *none* of the disallowed programs which were requested last year. Nor is there any provision in this year's budget request to reestablish any of the services we have been losing each year. This may be explained by pointing out that Weather Bureau budget requests are trimmed by the Department of Commerce and then skeletonized by the Bureau of the Budget before they ever reach the Congress.

Because of lack of funding support for their aviation weather service programs the Weather Bureau recently presented a plan to the Air Coordinating Committee to further curtail this service. Following is the preface and a summary of the proposed plan:

"The total aviation weather forecasting load presently handled by the Weather Bureau's Flight Advisory Service Centers (FAWS) far exceeds that which can be performed effectively and efficiently under present circumstances.



Recommendations:

1. That area type aviation forecasts be issued for three areas in lieu of the present four area Regional Synopsis and 25 Area Forecasts.
2. That the total number of locations in the United States for which terminal forecasts are issued be reduced from the present 349 to 250, and that the locations in this group for which 24-hour terminal forecasts are issued be reduced from the present 109 to approximately 90.
3. That the total number of places for which winds aloft forecasts are issued be reduced from the present 142 to approximately 131."

Safety Shuffle

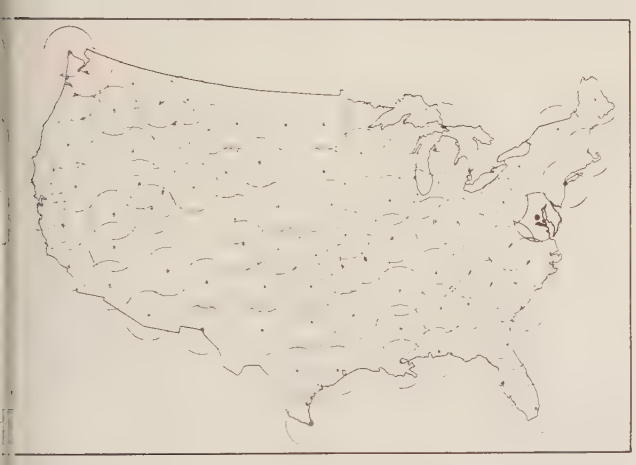
The chief reason cited for the above reductions in service was the desire of the Weather Bureau to continue the Flash Advisory Service which it started experimentally last spring in cooperation with the CAA. This new service is a significant safety development, in that flash advisories are issued to aircraft in flight, both civil and military, on potentially

hazardous weather conditions which may be encountered. These tersely worded messages are issued to CAA communication stations in the area for broadcast to aircraft in flight. This service requires a closer watch on developing weather conditions than is possible with present FAWS staffing. Funds were requested by the Weather Bureau last year to strengthen FAWS so that the service could be established on a continuing basis. However, funds for additional manpower to handle the service were not allowed by Congress last year and are not even in the budget request for this year! No explanation for this strange circumstance has been given.

Background Glimpse

A quick review of the establishment and workings of the Weather Bureau will permit a better insight into today's problems. Reaching way back to 1817, a systematic attempt was made to record the weather conditions over the United States at a given moment when tri-daily observations were taken at Federal Land Offices. Later, in 1870, the Congress created a U. S. National Weather Service as a branch of the Signal Service of the Army. Weather reports rapidly increased in importance and the Congress, in 1891, established the Weather Bureau as a civilian function under the Department of Agriculture.

Weather service to aviation began before the first powered flight in 1903, when preliminary studies of surface winds at Kitty Hawk, N. C., were compiled for the Wright brothers. The "Air Commerce Act of 1926" first outlined weather service for aviation. Passage of the "Civil Aeronautics Act



PROPOSED NETWORK OF AVIATION WEATHER *broadcast stations for continuous transcribed voice broadcasts using existing CAA low and medium frequency radio facilities. Total number of proposed stations, 88. Total stations now in operation, 1.*

1938" made aviation weather service a primary responsibility of the Weather Bureau. In 1940, the Weather Bureau was transferred from the Department of Agriculture to the Department of Commerce.

Responsibilities

The Weather Bureau is charged with a broad area of activity which comprises all the weather service required for the public safety and the national welfare. The responsibilities fall into these principle areas: Weather observing, forecasting, warning, recording, hydrology and flood warning, climatology, research and atmospheric physics.

The fact that most weather stations are located at airports, and 314 of the 314, does not mean that the total effort or even a major part of the airport weather station activity is devoted to aviation. It usually means that the important aviation weather observational portion of the task *must* be done at the airport location, and that all other weather service to the community is performed from the same location. Funds are insufficient to provide two weather stations in or near the same city.

In addition to supplying aviation information the Weather Bureau Staff at the station must be prepared to answer calls for information concerning the latest public forecast, prepare scripts for presentation over TV and radio stations, answer inquiries from agriculture, business, transportation agencies and hundreds of others concerned about weather. An example of just one phase of this ever increasing demand for service would be the rapid growth of Commercial TV which now numbers over 500 stations. In addition, hourly weather observations must be made and transmitted and the overall weather situation and upper air forecasts frequently reviewed. Over 85% of individual contacts with the Weather Bureau are made by telephone.

FAWS Function

The source of most of a station's aviation forecast information today is from the internal organization, the Flight Advisory Weather Service, FAWS. There are 25 FAWS units in the United States, each one located at a Weather Bureau station in the area for which the unit is responsible for preparing aviation forecasts. These FAWS units prepare at six-hour intervals, on a staggered basis, area, terminal and winds aloft forecasts for transmission on the aviation weather teletypewriter circuits. These forecasts become the basis for pilot weather briefings performed at all stations down the line, including CAA stations and hundreds of airports, and aircraft operators subscribing to the teletypewriter service. In addition, this information is used by a growing number of private forecasters. In a sense FAWS is a wholesale operation, while the job of retailing is left to the stations and subscribers down the line.

Why SAWRS

The Weather Bureau is required by law and the Civil Air Regulations to provide aviation weather reports at all airports serving scheduled air carriers operations. In addition, the Weather Bureau is to ". . . furnish such reports, forecasts, warning and advices . . . with such frequency as will best result in safety and in facilitation of air navigation . . ." Here is the derelict manner in which the law is carried out. Of the 700 airports in the United States and the Territories with scheduled air carrier traffic, only 244 have airport Weather Bureau stations. Further, there are more than *7,000* airports in the U.S., at which are based *65,000* civil aircraft without Weather Bureau Service.

The intent of the law is perhaps honored by a cooperative arrangement between the Weather Bureau and the CAA, the airlines and airport managements. Under this scheme the Weather Bureau redelegates a portion of its statutory observational responsibility to cooperative aviation interests. The Weather Bureau furnishes essential observing equipment and trains and certificates employees of the cooperating agency to report the weather. The reports so taken are official U. S. Weather Bureau reports. There are 240 CAA and 263 airline or airport cooperative weather stations of this type. These cooperating stations are referred to as SAWRS, an abbreviation for Supplementary Aeronautical Weather Reporting Stations. Roughly then, each group, the Weather Bureau, the CAA and the Airline or Airport Stations, do about one third of the work—a unique arrangement. This make-shift arrangement was made necessary by the tremendous growth of aviation which has outstripped the ability of the Weather Bureau to provide the required complete service.

This triple observation source has some serious shortcomings, one being that only part of the SAWRS reports are ever transmitted on aviation teletypewriter Service A. Chief reasons given are Service A communications are overcrowded, and for dispatch (legal) purposes the airline only need carry the reports on its own system as far as needed to keep the dispatcher and pilot informed of the airport weather. Airlines thus meet Civil Air Regulation requirements but other aircraft operators are not helped even though they may have an interest in the same airport weather report.

(Continued on page 63)

BUSINESS FLYING CENTER — TEXAS STYLE

By Alice S. Fuc

When a small, one-hangar operation started at Love Field in Dallas 26 years ago, no one could have predicted Southwest Airmotive's multi-million dollar lay-out, the ultra attractive business aviation terminal which opened early this year. Not even today's principle SAC officers—George Jalonick, Harlan Ray, Winston Castleberry—could have foreseen this spectacular achievement, just as no one could have predicted the upsurge of business flying which fostered the building of what is probably the country's most fabulous facility dedicated to business aviation.

Larger and more elaborate than many city airline terminal buildings, Southwest Airmotive's new facilities are an indication that business flying has finally come of age. The business pilot who taxies up in front of SAC's terminal building finds at his fingertips the utmost in convenience, comfort and service. Gasoline (red trucks for piston fuel, yellow for jet) and service are administered by 20 linemen operating on a 24-hour basis. The place is just as alert at midnight as at noon. This is a round-the-clock, seven-day operation, and visiting aircraft averaged over 40 a day every day of the week during the past year.

The first thing that meets the pilot's eye is the convex, glass-covered, two-story front. Landscaping and dramatic architecture impress him with the fact that this is the most elaborate privately maintained establishment of its kind in the country. Inside the terminal, however, the pilot soon discovers that this is more than a show-place. There is an air of quiet elegance to the terminal lounge, a place relaxed enough for meeting a friend, but elaborate enough for an official press-conference setting (and more than one world-famous personality has used it for that purpose). For more private business conferences, the VIP Lounge is available off the lobby.

Hungry? Mount the floating stairway to the "Flight Deck," the attractive, 75-person capacity dining room with lunch counter attached. The Flight Deck boasts an interesting view of the flight line and Love Field activities, excellent food by noted restaurateur Carlo Messina, the most beautiful menu in Texas, and everything from a $7.75 steak to a bo lunch.

Should you desire to go into Dallas from the termina rental cars are available at a Hertz office in the buildi and it's a 15-minute drive into town.

One of the most carefully designed parts of the build is the flight operations center, where a visiting pilot will fi everything from an extra-long table for spreading out ma and plotting courses, to sliding-door lockers for stor equipment and hanging up flight clothes. One side of room is covered with a large map of the United States, ma up of aviation charts for flight planning purposes. Dir telephone lines to tower, weather bureau and military faci ties are available, as well as facility charts and flight pla ning data. The office carries complete government ch coverage for the United States, Mexico and Canada, a Unicom (123.0) is in operation for communication w pilots aloft.

Adjoining the pilots' section is the office of Lorra Sanders, head of flight operations, who for the past 20 ye has been contributing her efficiency and know-how to t SAC organization. Her sense of fitness and artistry are e dent in some of the planning and decoration of the n terminal.

The executive offices, not seen by most transient pilo are as attractive as the rest of the building, from the wall- wall carpeting on the floor to the Bud Biggs collection original water colors of Dallas scenes on the walls. I cessed file cabinets and the most modern office appointme are a part of the office lay-out.

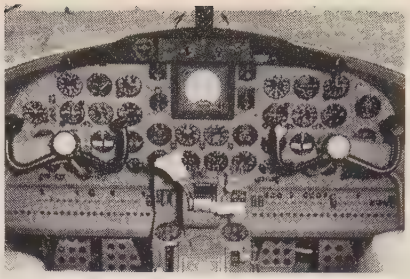
Just as pampered as the pilots and their passengers the airplanes that visit Southwest Airmotive. A Plane-O- at the rear of the terminal building provides storage for craft. Maintenance, both large and small, is available a a pilot would need real imagination to think up someth in the maintenance line that is unavailable at Southw Airmotive. The $4,000,000 SAC expansion plans, of wh the new business terminal building (*Continued on p.*

the MARK I-A

Newest...

of the *Learstars*

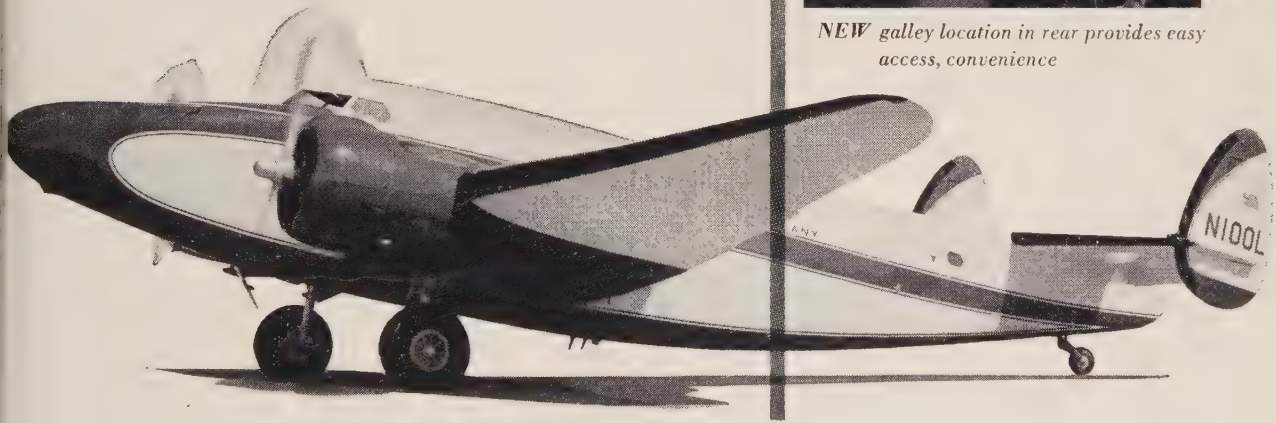
...world's most distinguished business aircraft



NEW "straight ahead" radar screen mounted in LEARSTAR Mark I-A instrument panel

NEW custom-built to Solo Cup Co. specifications is roomy, divan equipped lounge

NEW galley location in rear provides easy access, convenience



This proud *new* Learstar, built for Solo Cup Company, Chicago, represents another triumph in aircraft engineering. Combined are the high performance characteristics of both Learstar Mark I and Mark II. In every measure of safety, power, payload, cruising speed and range, the new Learstar Mark I-A matches the famous Mark I—yet it is offered at a greatly reduced initial cost. Fully loaded, with a crew of two, ten passengers, and 700 pounds of baggage, this new Learstar can travel coast to coast non-stop at a speed of 280 miles per hour. Learstars are the only business aircraft of intercontinental range—the only business aircraft that match airline speed and range.

The new Solo Cup Learstar Mark I-A is another fine example of business aircraft engineered and produced with a realistic view of corporate economy. If you now own or contemplate operating business aircraft, it will pay you to investigate the advantages of Learstar—how this superior business transport compares favorably with other business aircraft, both in original cost and economy of operation. For complete information, telephone, wire or write:

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AIRPLANES, MONEY AND TAXES

by Robert K. Polson

Part I

How well do you know your taxes? Once an aircraft is written off, does the real cost go up . . . or down? When is the best time to sell? Can you control true cost by controlling write-off? Most of these questions can be answered . . . or at least you can cut the problem down to size.

Suppose that you are writing off a $100,000 airplane (under straight-line depreciation to zero book value) at $20,000 per year over a 5 year period. The left column in figure 1 shows the disposition of purchase money at the end of the fourth year.

Of the $80,000 already written off, 52% or $41,600 would have gone to Uncle Sam in taxes had you *not* bought the aircraft (this $80,000 is subject to taxes if it is not listed as a business expense). The accountant calls this sum a "Tax Saving" . . . because the stockholders can't get it regardless of what you do. You have actually spent 48% of $80,000 . . . or $38,400 in money "corrected for taxes." The fate of the $20,000 still remaining on the books (book value) is yet to be decided.

Now suppose that you sold the aircraft at this time for $60,000. The righthand column shows that you sold for *more* than the book value (you get to keep this free of taxes, so forget about that). Your capital gain is SALE PRICE minus BOOK VALUE . . . or $40,000. Uncle Sam will take 26% of that in capital gain tax ($10,400) . . . but you can keep the remaining 74% . . . or $29,600. Since you were out $38,400 under the tax structure in column I, but got back $29,600 in column II, your TOTAL TRUE COST AFTER TAXES is the difference . . . or $8,800. This is a valid figure . . . but it doesn't mean much until you also consider the years of service. Since you held the aircraft 4 years, your true cost-per-year is $2,200. This is only one possibility. To see the entire picture we need a graph of true cost for various combinations of resale prices and years of service.

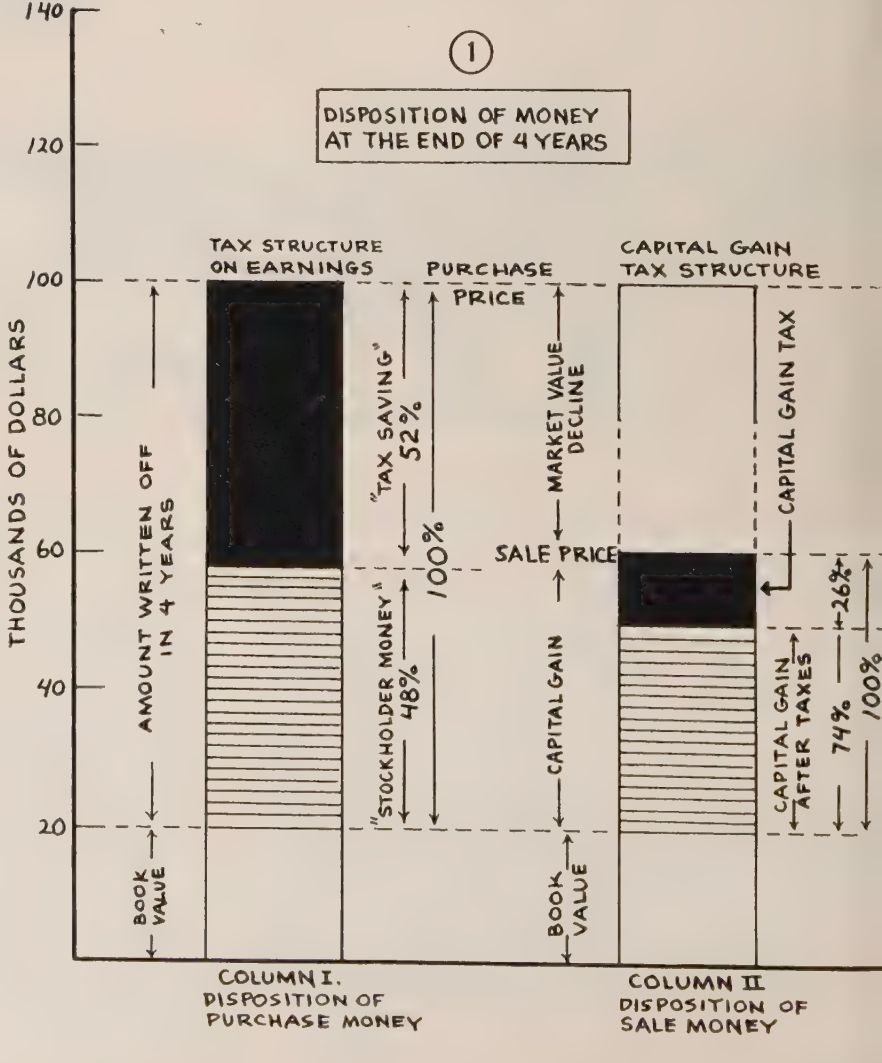
We computed true cost-per-year (which we will call "C" hereafter) in the sample problem as . . .

$$C = \frac{48\%\,(\text{write-off}) - 74\%\,(\text{Saleprice} - \text{Book value})}{\text{Years Held}}$$

We can turn this around with a little highschool algebra until (solving for Saleprice) we have . . .

$$\text{Sale Price} = \frac{48\%\ (\text{write-off}) - C\ (\text{years held})}{.74} + \text{Book Value}$$

If you used the sample problem ($100,000 purchase) . . . assigned values to



U. S. FIBERTHIN®—MINIMUM WEIGHT...NON-ABSORBENT...STOWS AWAY COMPACTLY

Here is an all-weather protective covering that can't be matched for use in the aircraft field. U.S. Fiberthin is a remarkably light protective fabric yet it is far superior in tear strength. Woven of ribbon-like threads of durable nylon, coated with vinyl or neoprene, this modern covering fabric will not absorb water. It protects against rain, snow and sleet...stands up under gale-force winds. Extra light and easy to handle...stows away neatly in your plane. Available in a range of colors. U. S. Fiberthin also provides perfect protection for shipping airplane parts —as shown in the photo of the motor cover above. Ask your supplier for U. S. Fiberthin...or write for information.

United States Rubber

Stoughton, Wisconsin

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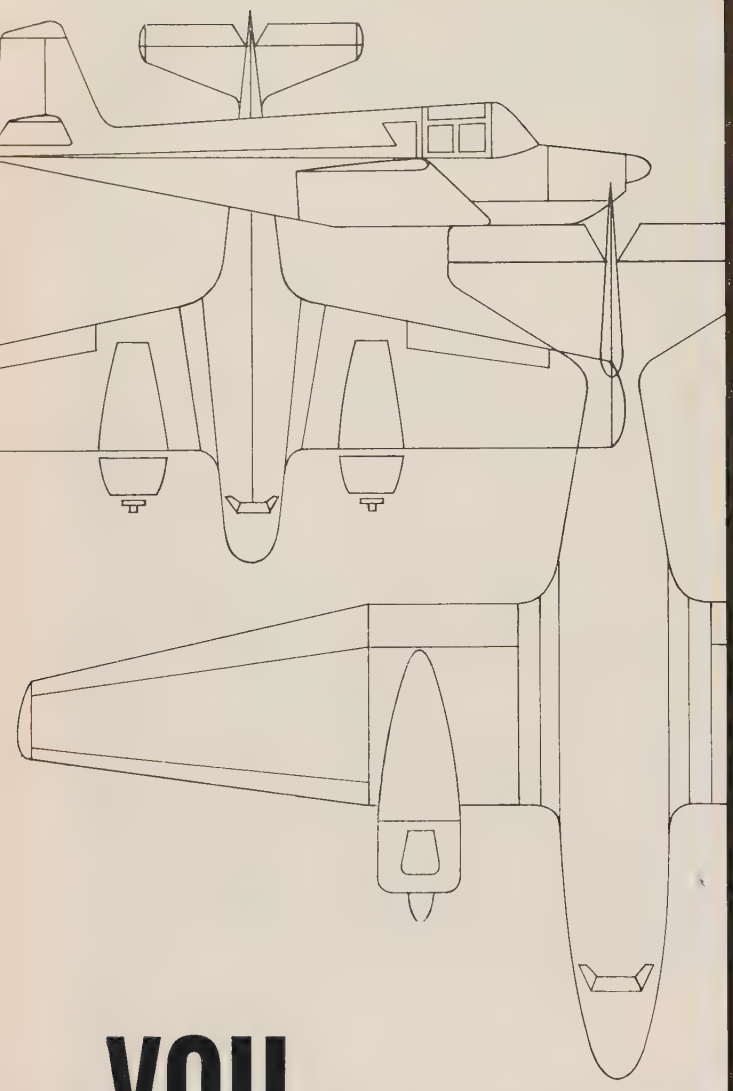

now **you** can own the finest radio equipment in the world

Among men who know radio, the Collins reputation for the highest standards is universally known. Professional pilots with airline and military flying experience associate quality and performance with the Collins trademark. Now, from this leader in airborne radio come the finest systems in business aviation, tailored to your aircraft type. Collins is appointing nearly 200 distributors to serve your radio needs — whether with a new communication transmitter or a complete new Collins system. Check the radio services offered in the adjoining table and see your Collins distributor for price information.

COLLINS

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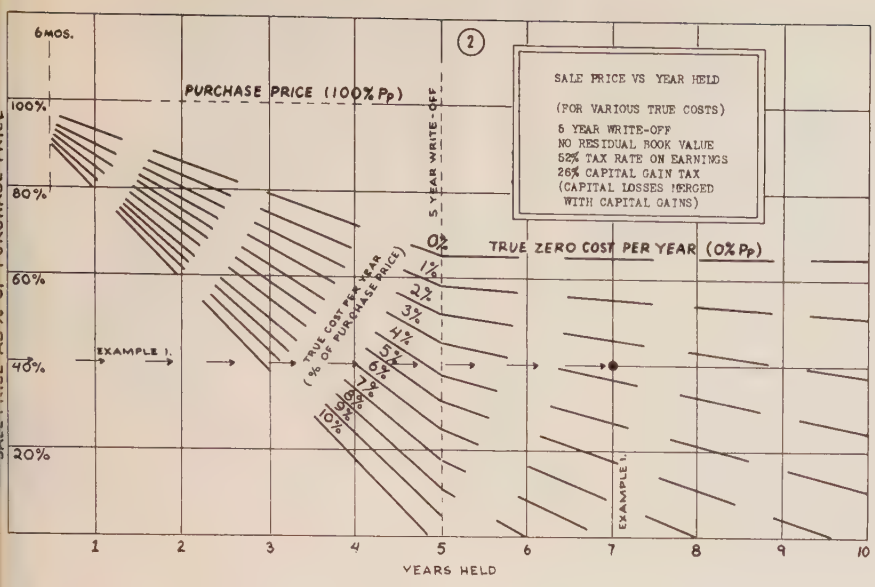
SINGLE ENGINE SYSTEM	Type Number	Weight Pounds
COMM		
VHF Receiver, 190 crystal-controlled channels	51X-3	3.25
VHF Transmitter, 90 crystal-controlled channels, 3 watts	17L-8	2.5
Power Supply	427B-2	5.0
NAV		
VOR/LOC Receiver	51X-3	3.25
Power Supply	427B-2	5.0
Omni-Converter-Indicator	344D-1	2.4
ILS		
1-light Marker Beacon Receiver	51Z-2A	4.9
TOTAL WEIGHT		26.3
This system uses only 8.05 amps of 13.5 vdc		

LIGHT TWIN-ENGINE SYSTEM	Type Number	Weight Pounds
COMM		
VHF Receiver, 880 crystal-controlled channels	51X-2	10.5
VHF Transmitter, 680 crystal-controlled channels, 25 watts	17L-7	14.0
STANDBY COMM		
VHF Transmitter, 90 crystal-controlled channels, 3 watts	17L-8	2.5
NAV I		
VOR/LOC Receiver	51X-2	10.5
Omni-Converter	344B-1	14.0
RMI dual pointer (ADF & 344B-1)	332C-1	2.0
FLIGHT DIRECTOR		
Computer, gyro and instruments	FD-104	28.5
NAV II		
VOR/LOC Receiver	51X-3	3.25
Power Supply	427B-1	5.0
Omni-Converter	344A-1	9.0
Course Selector Indicator	331H-1	2.0
ADF		
Automatic Direction Finder (includes antenna, receiver, control)	DF-201	30.0
COMPASS		
Gyro compass, including gyro, flux detector, amplifier and slave indicator	MC-102	14.3
ILS		
10-channel Glideslope Receiver	51V-3	6.4
3-light Marker Beacon Receiver	51Z-2	4.9
TOTAL WEIGHT		156.85
This system uses only 10.86 amps of 27.5 vdc		

HEAVY TWIN-ENGINE SYSTEM	Type Number	Weight Pounds
COMM		
VHF Receiver, 880 crystal-controlled channels	51X-2	10.5
VHF Transmitter, 680 crystal-controlled channels, 25 watts	17L-7	14.0
STANDBY COMM		
VHF Transmitter, 680 crystal-controlled channels	17L-7	14.0
NAV I		
VOR/LOC Receiver	51X-2	10.5
Omni-Converter, Servo Amp, OBI	344B-1	13.0
RMI dual pointer (ADF & 344B-1)	332C-1	2.0
NAV II		
VOR/LOC Receiver	51X-2	10.5
Omni-Converter, Servo Amp, OBI	344A-1	9.0
Course Selector Indicator	331H-1	2.0
ADF		
Automatic Direction Finder (includes antenna, receiver, control)	DF-201	30.0
ILS		
10-channel Glideslope Receiver	51V-3	6.4
3-light Marker Beacon Receiver	51Z-2	4.9
COMPASS		
Gyro Compass including, gyro, flux detector, amplifier and slave indicator	MC-102	14.3
AUTOPILOT		
AUTOMATIC PILOT including FLIGHT DIRECTOR, controls, instruments, servo controls, vertical gyro, computer and computer amplifier	AP-101 FD-104	130.0
PA SYSTEM		
Passenger Address Amplifier	346D-1	9.6
INTERPHONE		
Interphone Amplifier	346A-1	6.0
RADAR		
Including indicator, control, synchro-		



C" in increments of $1,000 . . . and olved for Saleprice for various years, ou could plot the results as in figure 2. This is a TAX SEPARATOR . . . he answer is the real McCoy. All the money data is labeled as a % of purhase price instead of in actual dollars . . . to give a wider range of applicarion. In Example 1, if an aircraft is old for 40% of the purchase price at he end of 7 years, the graph shows by interpolation) that the true cost-er-year was roughly 2.6% *of the purhase price.* Miscellaneous comment:

(1) The graph will work for any em of business equipment . . . not just ircraft.

(2) The illustration is drawn for a year write-off to *zero* residual book alue. If you want something else, ou'll have to change the "write-off" nd "book value" in the equation . . . nd draw a new graph.

(3) To correct for interest on borowed capital, throw the total interest n with the purchase price before you tart.

(4) The graph works for capital ss . . . as well as for capital gain. he term "Saleprice—Book value" in he equation simply becomes a *minus* uantity instead of a *plus* (Losses are ssumed to be "merged" with capital gains on other equipment items).

(5) Maximum *possible* cost-per-year is read along the base line which indicates a *zero* sale price. In other words, if you kept an airplane for 8 years and then "gave it away," it couldn't possibly cost you more than 6% of the purchase price per-year. In toying with the equation, you can actually come up with a *minus* sale price. Have faith! This is the amount you can pay someone to "haul it off" . . . and still meet conditions inserted in the equation.

What happens after the equipment is written off? Your problem for these years is *conservation of capital gain* (let's hope so, anyway). Should you cash your chips now . . . or trade for a few more years of service at the expense of a lower sale price later on? To see what happens, let's change the last equation slightly until it reads . . .

$$\text{Sale Price} = \frac{48\%\ (\text{write-off})}{.74} - \frac{C\ (\text{Years held})}{.74} + \text{Book Value}$$

Once the equipment is written off, "book value" becomes *zero* and you can eliminate that item entirely. Since the "write-off" is at a maximum and must remain fixed, the term $\frac{\text{"48\% (write-off)"}}{.74}$ must be a *constant* value, and you can simplify the equation for the righthand portion of the graph to . . .

$$\text{Sale Price} = \text{CONSTANT} - \frac{C(\text{Years Held})}{.74}$$

By means of the original equation you can solve for your present true cost (based on the present market value of your aircraft). If you inserted this value of "C" in the last equation above, you could solve for the "break-even" sale price at any future time . . . a hypothetical sale price giving you the same cost as your present one. Then the question is "*Do you think you can get that price when the time comes?*" If not, then it is cheaper to buy new equipment. Why pay more money to operate an old airplane?

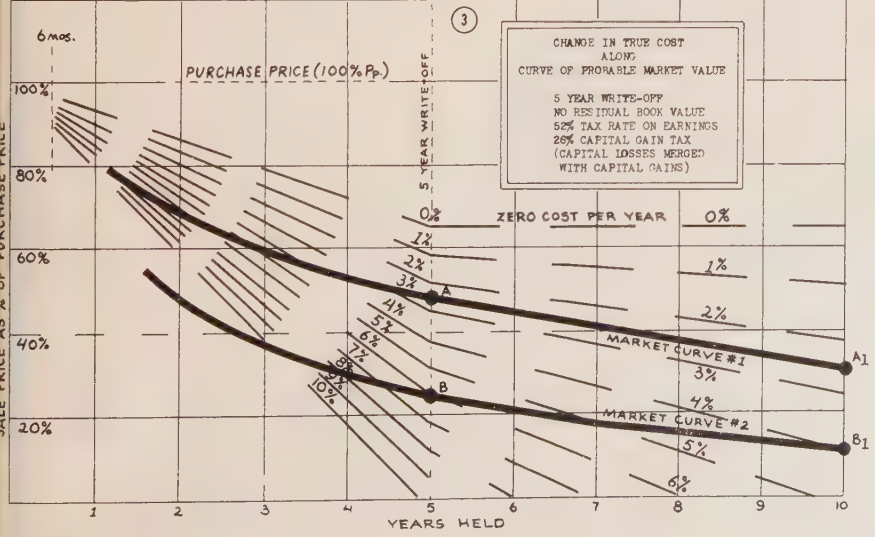
In computing this future "break-even" sale price, you fixed the value of "C" in the term $\frac{\text{"C(Years Held)"}}{.74}$ . . . in order to get the same true cost. The only thing that can possibly change your answer is the number of years involved. This leads us to the conclusion that $\frac{C}{.74}$ is the break-even rate for depletion of capital gain. If the rug is slipping out from under you faster than this, then it might pay to see your new aircraft dealer. This also works the other way . . . true cost may be going up . . . or down. You can see the complete picture and "how close" your guess has to be by "overlaying" the Tax separator with curves of probable market value as in figure 3.

These curves were manufactured out of thin air for illustration purposes only. With this in mind, let us assume that your equipment has declined in value along market curve No. 1 . . . until at the end of 5 years it will bring 48% of the purchase price (point "A"). Should you sell? By looking around at prices for older equipment, you estimate that your aircraft should be worth 31% (point "A_1") at the end of 10 years. The Tax Separator shows that your true cost-per-year is roughly 2.5% of the purchase price at both points. So you decide to sell to get out from under the additional maintenance.

Someone else may possess equipment which declines along market curve No. 2. The answer is not the same. At the end of 5 years (point "B") the true cost-per-year is 6% . . . but could be reduced to 4% by holding the equipment another 5 years and selling at point "B_1."

The Tax Separator idea works very well on equipment items which follow a definite curve . . . aircraft are somewhat unpredictable. Your guess may be as good as the next fellow's. But as long as you're going to enter the fishing contest, you might as well have an accurate scale on which to weigh the winner . . . that's half the battle, anyway.

Part II will argue the matter of inflation . . . where the replacement has gone up in value . . . and will make some comparisons of true cost under different depreciation policies.

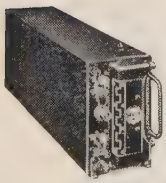


marching forward with...

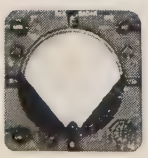
AVIATION

Grumman Gulfstream

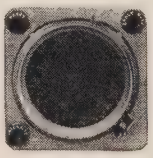
The aviation industry and RCA have long been partners in progress. To this partnership, RCA has contributed a wide range of electronic aids that have played important roles in bringing aviation to its present high level of dependability, comfort and safety. A few that have found special application in civil aviation are named here.



RCA Air Traffic Control Transponder (AVQ-60) automatically and instantly enables the traffic control radar to locate and positively identify aircraft within its range. Light in weight and compact, it is designed for airline, business and military use.

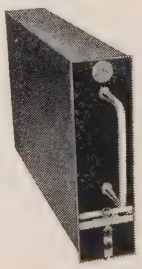


RCA Weather Avoidance Radar (AVQ-50) brings the comfort and time-saving features of airborne weather radar to aircraft with power and weight limitations, such as Aero Commander, Twin Bonanza, Beechcraft Super-18.



RCA Storage Display Tube Indicator increases the effectiveness of the display by permitting the reading of the indicator in broad daylight without hood or shielding.

RCA Weather-Mapping Radar (AVQ-10), now used by many of the world's leading airlines, enables the pilot to "see" and evaluate the weather many miles ahead so that he may avoid areas of turbulence. This makes long and costly detours unnecessary, saves time and increases passenger comfort.



RCA Marker Beacon AVR-200 meets the demand for lightness, transistorized design, low power requirement and minimum maintenance. Functions on DC or AC primary, and actually needs less power than any of the three lamps it operates.

Ask for full information with regard to any or all of these items.

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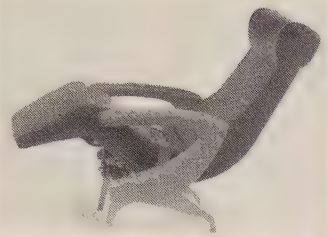


Medical Research Establishes New Seating Principle

By James B. Carter

MODEL MARLA FREEBORN *relaxes in her "Conturflite" chair. Bob Logan, aluminum equipment supplier, isn't exactly relaxed, but not unhappy.*

Recently I saw, sat in, relaxed in and rode in an entirely new type of aircraft seat, scientifically designed to fit the contours of the human body. The new seat, called "Conturflite," was developed from the findings of medical researchers in an eastern university who were studying the effects of fatigue in patients undergoing medical treatment. Studies proved that physical comfort of the patient—under treatment—had an important effect upon his mental attitude and response.

Having had first-hand experience with dog-tiredness, I was curious to get behind the scenes and learn how this revolutionary seating principle for aircraft was developed. I discovered that Universal Equipment Corp. of Culver City, Calif., two years ago acquired the basic rights to manufacture aircraft seating equipment embodying the "skeletal curvature" principles recommended by the medical research group and prepared to apply them to aircraft seating. Builders of aircraft seats had already solved the problems of size and weight, and here apparently was the opportunity to build in greater comfort, scientifically.

The firm set its design engineers to work in collaboration with leading anthropologists, who contributed data covering muscular support of the human skeletal structure. Universal's engineers learned that most human bodies fit into a basic mathematical curve, determined by the positioning of the cervical and lumbar areas of the vertebrae. When these areas are supported properly, they learned, muscular strain is lessened over all parts of the body. During the next two years of much testing, a finished design, utilizing the curvature principle, resulted in an aircraft chair that adapts itself to the contours of the human body—as opposed to the body being forced to adapt itself to the chair.

I learned of this new seat at a luncheon with Verne Benfer of PacAero Engineering Corp., Santa Monica, and Charles Prescott of Universal. Verne told me that they had equipped their latest Learstar and a Beech D 18 with "Conturflite" seats and planned to give them thorough tests. The seats had been fully certificated by CAA and Prescott's production line was in full swing. A fresh new approach in styling had been created by a leading industrial designer. Installations had already been made in several different types of business aircraft operated for personnel transport. The firm is manufacturing a standard seat employing the contour principle and provides custom equipment when required.

The major difference I discovered during a flight in the Learstar, was that the seat seemed to "fit me" from head to foot. The firm, yet gently yielding padding exerts support all the way from the head and back of the neck to the legs and feet when in a fully reclining position. You do not feel any point of unequal weight distribution, such as uncomfortable pressures on the hips or thighs. The chairs are completely adjustable with infinite positioning controls in the arm rests. A big difference is that the back areas and the seat adjust themselves together as the position is changed. There isn't any "sliding in or out" of the seat cushion as you sit up or recline. A portion of the back cushion, called the lumbar pad, gives full support to the lower spine in any attitude. In the upright position, much of the body weight is absorbed by the cervical back and lumbar pads, instead of being transmitted to the seat. I imagine this would be of some help in rough air, also.

The leg rest in the reclining positions reduces much of the uncomfortable weightiness most of us encounter on long flights. Because the weight of the trunk and legs is evenly distributed, circulation of the blood is not impeded and your leg doesn't "go to sleep."

I was told that the findings and recommendations of the Aviation Crash Injury Research of Cornell University have been incorporated. Shock resistant padding, absence of sharp, exposed edges and recessed hardware are embodied in the basic "Conturflite" design. The lightweight structural materials are stressed to yield instead of fracture, thus adding a safety factor which is always a consideration. (*Cont. p. 55*)

NAVICOM

ON RANDOM ALTITUDES—VFR

(One Pilot's Opinion)

by Allen W. Hayes

Tompkins County Airport
Ithaca, N. Y.

CAB proposed civil air regulations Draft Release 57-27 (see SKYWAYS Feb. '58) part 60.32 stipulates cruising altitudes for VFR flight below 29,000 ft as follows:

When an aircraft is operated in level cruising flight at 3,000 ft or more above the surface, the following altitudes (MSL) shall be observed:

(a) Below 29,000 ft. At an altitude appropriate to the magnetic course being flown, as follows:

(1) 0° to 179° inclusive, at odd thousands plus 500 (3500, 5500, etc.)

(2) 180° to 359° inclusive, at even thousands plus 500 (4500, 6500, etc.)

In the absence of positive control, the basic concept of such rules may be unsound. However, existing versions of these rules are so complicated that they are practically unworkable. The proposed rules simplify existing ones, and they are improvements—provided that the basic concept is accepted.

These rules do not decrease traffic density at specified altitudes. Instead, they concentrate traffic at 500-foot intervals, *leaving intervening levels entirely vacant.* Fortunately, this effect is partially offset by our altimeters.

Mechanical and pressure-setting variations cause present altimeters to indicate several hundred feet from actual altitude. Pilot inability to precisely hold a specified indicated altitude adds to these errors. This distributes actual flight altitudes along a conventional error curve with a few flights several hundred feet from the specified altitude and increasing traffic density as that level is approached. Perfect altimeters and pilots would put all this traffic at precisely the same level—obviously *increasing collision hazard.* When more precise compliance with a rule defeats its intention, then there must be something wrong with the basic concept of the rule.

Planes on identical headings with identical airspeeds have zero relative speeds and no collision hazard. The heading/altitude collation of the rules may tend to reduce relative speeds, giving some measure of protection. But when headings differ by only ten degrees, a rate of closure of 30 knots can exist between two planes both flying at 180 knots. The much larger heading (up to 180 degrees) and airspeed differences actually occurring indicate the futility of seeking collision protection by altitude rules without other positive control measures.

The dubious benefits of relative speed reduction are bought at the cost of increased traffic density at the specified altitudes, increasing collision hazard. Though the resulting collisions may involve less impact, we have actually increased the chances of getting "just barely" killed!

With positive control, altimeters and pilot limitations require a buffer zone above and below an assigned altitude dictating the 1,000-foot intervals now employed by ATC. Without ATC, several flights may occupy the same altitude. This "calculated risk" of IFR flight in uncontrolled airspace has yet to produce an actual collision. But we invite one when we concentrate traffic at specified altitudes without protecting flights at a common altitude from each other. Without positive control, the levels vacated to provide buffer altitudes become a liability. It would be better to spread the traffic in them.

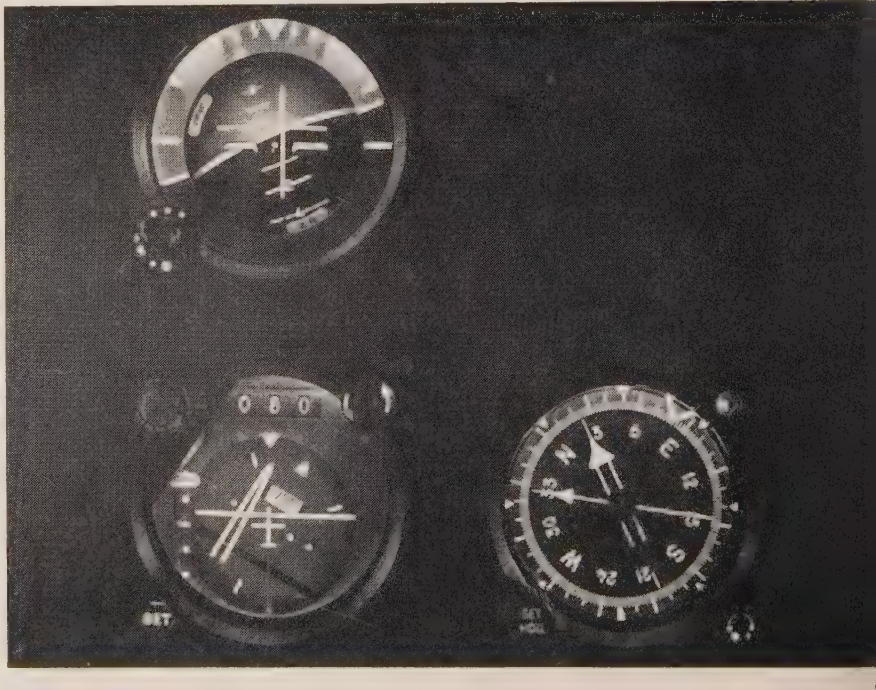
If altitudes were prescribed by 20-degree/50-foot intervals, it would thin out traffic. No one could fly this accurately, and flights supposed to be above others might actually be at the same level—or below. But less traffic density at any one altitude would lessen collision probability. Of course, random altitude selection with no rules at all would give the same effect. This is the point.

If cruising altitude stipulation (without positive control) is useless—or even harmful—for IFR, it is still worse for VFR. By its very name, "VFR" implies collision avoidance by visual means. Adequate cloud layers is proper with sufficient cloud clearance. But altitude stipulations may make such flight either more complicated—or even impossible. And for what?

A majority of VFR collisions have occurred under conditions of good visibility, with one flight overtaking the other. It is no coincidence that head-on encounters are virtually unheard of while collision frequency increases with decreasing angles of convergence from head-on. The rules prohibit head-on situations. But in doing so, they cut in half the number of eyes in a position to effect the visual concept. Having concentrated more traffic at specified levels and provided no other protection, our rules then require pilots to turn their backs on potential adversaries!

The illusion of protection implied by cruising altitude designations may give pilots a false sense of security and still further decrease vigilance. A poor analogy is seen in the driver who will constantly scan his rear-view mirror when speeding, and not look there at all when driving at proper speeds.

The more precisely pilots attempt to abide by specified cruising altitudes the more they must look at their altimeters instead of outside. At the same time that this puts them in denser traffic, it permits less chance to observe



EFFECTIVENESS OF SPERRY'S NEW IFS *(Integrated Flight System) is pointed up in this photo taken to simulate actual cockpit conditions at dusk, when perfect "readability" most difficult to obtain. The system's three instruments, which replace many conventional cockpit indicators because they display pre-computed flight data, are: the R-1 Pictorial Deviation Indicator, a basic radio navigation and landing control instrument; the HZ-3 Horizon Flight Director, a combined artificial horizon and Zero Reader flight director for precise navigation and altitude control; and the C-6 Gyrosyn compass master indicator, a basic magnetic and radio direction indicator.*

hat traffic. Here we have created a ruly vicious circle.

In the absence of positive traffic con-rol in the ATC manner, designation of ruising altitudes for IFR flight is bad. For VFR flight, such rules are worse. Elimination of these rules would allow andom altitude selection and more niform distribution of traffic at all ltitudes. This offers both increased afety and complete simplicity at the ame time. For VFR operations, a good ddition would be to encourage cover-ng altimeters with a placard: "LOOK)UT."

ondenser Discharge Lights For mall And Medium Business Aircraft

The Hoskins Starlighter anti-collision ght has been designed for installation n the Nation's Business Aircraft fleet. consists of three basic parts, which re:

1. One power pack which operates from the primary electrical system of the aircraft. Both 12 and 24 volt systems are available.
2. Two identical light units which will fit in the presently used 3¾-in. mounting brackets, plus the asso-ciated cables.

The power pack converts the low oltage of the aircraft electrical sys-m to 450VDC. This higher voltage stored in two capacitors and is dis-harged by a regulated tripping circuit rough the two flash lamps. The dura-on of the intense blue-white flash of ght is approximately 1/1,800 sec. and ulses at 55/65 flashes per minute.

The condenser discharge type of light analogous to filling a bucket (capac-ors) from a water faucet (aircraft's ectrical system) and then quickly mptying the bucket (the discharge rough the flash tubes). Thus, from a latively low source of electrical input, is possible to obtain a tremendous rst of light energy, at regular inter-ls, and still not over-tax the electrical stem of the smaller type aircraft. eight is approximately 15 lbs.

One of the greatest advantages of the arlighter over other types of anti-llision lights now in use on these air-aft, is the ability to be seen in the peripheral area of the pilot's vision. The human eye does not have the sensitivity to detect red light, unless that light is within an approximate 45° cone, directly in front of the retina. The intensity of the Starlighter is approximately 80,000 ECPS.

For the past three years the Starlighter has been flown day and night in every possible weather condition without a component failure for more than 1,800 hours. To date, there have been no adverse reports because of loss of night vision, vertigo or other irritation.

For flying in rain or snow, the Starlighter produces a most unusual effect. Rather than the swirl of blurred snow flakes or rain drops that is normally encountered with a pulsating or rotating light, the instantaneous flash of the Starlighter momentarily freezes the movement of the moisture particles.

Under haze or fog conditions, the effect of the flash from the Starlighter is similar to that of lightning. The area immediately surrounding the aircraft is momentarily illuminated, but the light which is reflected into the cockpit of the aircraft does not destroy the night vision of the pilot. (NOTE: The CAA recommends that this, and all other anti-collision lights, be shut down while flying on instruments).

(Continued on page 52)

Helicopters for Business

HAA Member Firm Is First To Operate Jet Helicopter

JET HELICOPTER MAKES HIGH ALTITUDE DELIVERY *to construction job site.*

Aetna Helicopter Corp., Etna, Calif., was first commercial firm to put the Alouette II jet helicopter to use when it carried two-and-a-half tons of sensitive electronic equipment to the 9,575-foot peak of Roof Butte mountain in northeast Arizona.

Aetna's president, Robert E. Trimble, is treasurer of the Helicopter Assn. of America. The firm took delivery of the copter from Republic Aviation Corp. The French-developed gas turbine-powered five-place model is the first of its kind to be certified for commercial operation in the U.S. by the CAA.

The mountain peak delivery was part of a construction program by the Four Corners Pipe Line Co. which is establishing one of the country's highest microwave relay stations. When completed this spring, it will automatically control the flow of oil through a pipeline extending 850 miles from Los Angeles, Calif.

The helicopter air lift proved safer, faster and cheaper than arduous mule-pack which supplied equipment for earlier phases of the job.

Illinois College Has Unique Copter Flight Training Dept.

Lewis College of Lockport, Ill., is the only college in the United States that has a helicopter department which offers flight training as a regular part of the school curriculum.

First college in this country to open such a department, Lewis College's Helicopter Dept. was started in 1947. Albert H. Luke is department director.

Graduates of the first class were Harry Miller, now with Bell Aircraft Corp., and Ham Reidy and Michael Meager, both with Chicago Helicopter Air Service which Reidy founded.

Other unusual students include Miss Marilyn Himes of Washington, D.C., who became the first woman to be licensed a helicopter instructor in the U.S. Yukiaki Kawata is now flying helicopters for the Japanese version of the CAA.

Besides flight training, the school undertakes extra-curricular assignments. These included collecting test water samples from Lake Michigan for the Chicago Filtration Dept., swinging a bos'n chair with 600 feet of rope to speed weatherproofing a 230-foot smoke stack, seeding strip mine wastelands in Oklahoma and Kansas and aiding in measuring movements of glaciers and determining depths of ice caps in Alaska for the Arctic Institute of North America.

Lewis College with its unusual helicopter department is aiding business 'copter flying through training of pilots and direct assistance.

Rotor Head-Blades Test Stand

A whirl test stand for research, development and testing of helicopter rotor head and blades, is now in operation at Sikorsky Aircraft Div., United Aircraft Corp., Stratford, Conn., after five years' design-construction work.

The huge windmill-appearing structure is said to be the largest such test stand in the world. Company spokesmen believe that the rig will give "tremendous impetus to the producing of helicopters that will be larger, faster, safer and carry heavier payloads than any rotary wing aircraft now in use."

The cone-shaped, steel-plated test stand is as high as a five-story building. Capacity is 8,000 hp and 60,000 lbs thrust. It is designed for expansion to 16,000 hp and 120,000 lbs thrust.

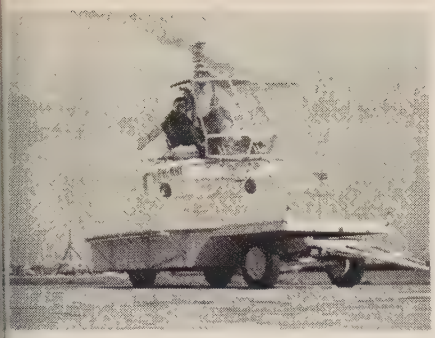
Powered by the largest vertical direct current dynamometer ever built, the stand's motor is controllable through a speed range of from 0 to 275 rpm's. This permits operation at the normal speed range of helicopter rotors without using gear reducers or drives necessary with other types of power plants.

Operation of the stand is remote controlled. It includes a closed circuit television with the camera on top of an adjoining elevator structure, and the monitor set up in the control room. Before the stand is operated, the camera pans the platform on top of the cone. This is a final check to see that all technicians have cleared the catwalks. Pictures of the tests range from three-foot close-ups to wide-angle views.

Helicopter Pilots Group Formed

Announcement of the formation of the Helicopter Pilots Association is made by group founder, Arthur T. Carter. An organization of licensed helicopter pilots, the association's headquarters is at 3510 Reeves St., Fort Worth, Tex.

Purpose of the organization is to promote safety programs for helicopter pilots as well as to benefit the pilot and their special needs through group representation.



Dutch Ramjet Copter Certificated

World's first ramjet helicopter to receive a civil certificate of airworthiness is the two-place Kolibrie of the Netherlands Helicopter Industry NV.

Certification, based on U.S. required standards, was made after two-and-one-half years of work including a 500-hour endurance type-test.

First deliveries have been made to buyers in Holland. Factory is at the Rotterdam Airport.

The copters twin ramjet engines have separate fuel systems. Engine output is 50 ehp each. Civil version gross weight is 1,434 lbs. Cruising speed is 60 mph with one hour endurance carrying pilot only. Economy of operation is emphasized by NHI.

Canada's Dept. of Transport Gets Four Bell 47J's

Canada's DoT has taken delivery of four new Bell 47J helicopters which will probably see service in the Arctic this summer as part of the government agency's resupply and patrol activities, according to Jack Hunter, DoT superintendent, flight operations.

Helicopters are operated from fantail heliports of four icebreaker ships and one survey vessel. The copters serve as an extra pair of eyes for the ship captains through Polar ice flows.

Pilots who accompanied Hunter to Bell's Fort Worth, Tex., plant to pick up the new craft were Bill Glennie, Doug Pinhey, Ivor Roberts and Roy Webster; mechanics were Dick Preston, Ed Ironmonger, Jack Casey and Johnny Robilliard.

Other Canadian customers awaiting delivery of Bell copters are the provincial government of Alberta, Hydro-Electric Power Commission at Toronto, Okanagan Helicopters of Vancouver, Laurentide Aviation of Montreal and Spartan Air Services of Toronto.

THE WORKING 'COPTER

Not All Birds In The Bayou Country Have Wings . . . Some Have Rotor Blades

In the bayou country of Louisiana people have probably become as familiar with the helicopter as U. S. Army wounded did in Korea.

Boasting proved and unmatched versatility in the air, the helicopter in the past three years has become an important link in the vital transportation network required by oil companies operating offshore in the Gulf of Mexico.

Offshore oilmen consider speed essential in their work. The helicopter provided the assurance that rough seas wouldn't block the transport of men and equipment to distant, at-sea drilling sites. The California Co. of New Orleans, La., is one firm that "bought" this idea.

Little restricted by weather, many times faster than surface travel and generally more economical and practical than large amphibious aircraft, the whirly-bird has earned the reputation of being the backbone of offshore oil's air operations.

In 1955, about a year after the copter was pioneered for offshore oil use, The California Co. put two helicopters into service. Today the firm owns, operates and maintains five . . . four Sikorsky S-55's and one Bell.

Operating from three coastal bases to offshore destinations as far as 60 miles in the Gulf, Calco's helicopters are used primarily to transport key personnel, as well as to "hotshot" equipment needed in a hurry and to assist surface craft in transporting drilling crews to and from the rigs.

Other notable uses of the helicopter have been initiated by Calco. It has shown its worth to geophysical crews, as a pre-storm personnel evacuation carrier and for post-storm reconnaissance and prompt return of personnel to structures located in waters still too rough for boats to reach safely.

The helicopter has proved to be an important morale booster, too. Former fears of delayed transit to hospitals when illness or injury struck in lonely Gulf oil locations are now abated by the quick arrival of radio dispatched helicopters.

Utilizing five copters, four of which are in daily service, Calco flies an average of three and one-half hours per machine per day. This adds up to an average of 25,000 relatively low-speed, but highly versatile, air miles every month. Generally scheduled for use in daylight hours, six or eight emergency night flights per month are being logged by Calco pilots.

Calco's 1957 helicopter utilization statistics show that a total of 33,196 passengers were carried and 175,722 pounds of cargo transported. During the year, Calco pilots flew a total of 10,171 day flights and 162 night flights, logging more than 4,500 flying hours.

During last year, bad weather, including hurricanes, accounted for 38½ inoperative days. Maintenance took up another 30 days.

An accident-free record is a constant goal for the company. This includes other amphibious aircraft used in water-bottom operations . . . five Cessnas, one Grumman Goose. These are particularly adaptable to landings and takeoffs in the bayou-populated Delta country.

California Power Company Uses Copter For Unusual Assignments

Southern California Edison Co. uses both Bell and Sikorsky helicopters to carry out unusual jobs which are a routine part of the firm's work.

Setting wooden distribution poles, pouring concrete and placing huge sections of steel transmission towers in rugged mountain terrain was done using the Sikorsky S-58.

One spectacular operation meant picking up a complete tower, carrying it over ridges and gorges to place it on its footings several miles distant.

In the Le Cumbre Peak area north of Santa Barbara, 20 poles were set in holes in the first hour of operation. Similarly impressive time-saving figures are expected to emerge from another pole-setting operation under way in the High Sierra Nevada Mountains.

Edison is building a 16,000-volt power line from Big Creek Powerhouse No. 8 to the construction site of the Mammoth Pool hydroelectric project. The poles are being flown to positions ranging from a few hundred yards to 12 miles.

How Customers Use Leased 'Copters

A. B. Dick Co.: Vice-president made airline connection at Midway Airport in just 12 minutes via helicopter. Company car or taxi would have taken an hour and 40 minutes, because of icy ground conditions.

Motorola Corp. had Skymotive's HAL pick up urgently needed parts from one plant and rush them to the assembly line at another, avoiding a costly shutdown. Heliports atop two of its plants make possible such operations, as well as executive transport.

Texas-Illinois *Natural Gas* rushed by helicopter to the scene of a pipeline explosion in Southern Illinois, minimizing confusion and expediting repairs.

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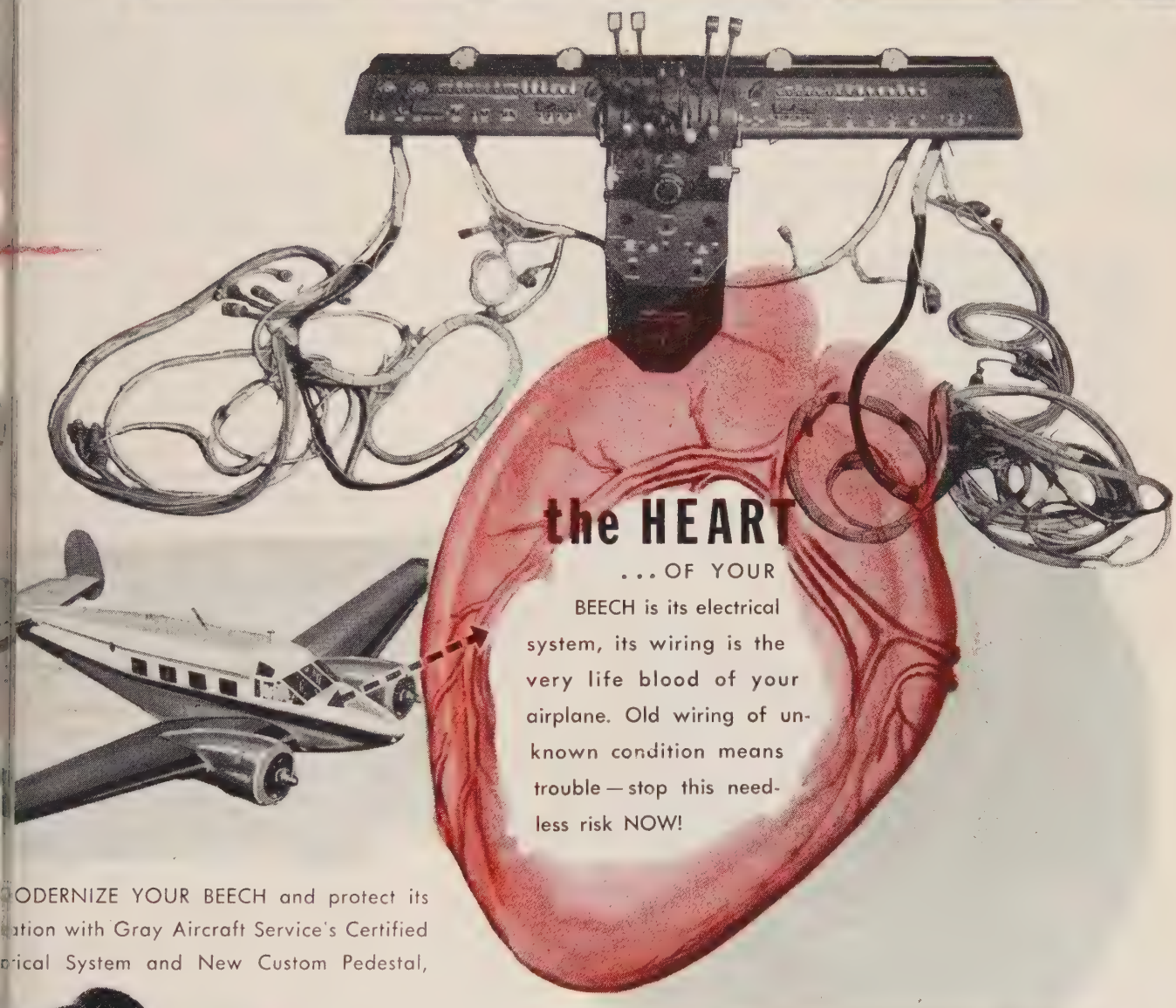

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in the business hangar . . . .

■ **SKYWAYS INC.,** Portland-Troutdale Airpt, Troutdale, Ore., completed engine changes, custom radio and instrument panel installation, and interior conversion on DC-3 owned by Pacific Power and Light Co.

Jack Mears and **Heintz Construction Co.** had their Cessna 310's in for 100-hr checks.

Lee Hoffman Const. Co. had dual omni and course director installed in their Cessna 310.

■ **SOUTHWEST AIRMOTIVE CO.,** Love Field, Dallas, Tex., completed 100-hr inspection on Cummins Engine's DC-3. Pilots are Bill Pruner and Phil Kaufeld.

Lockheed Aircraft Corp.'s Lodestar was in for 100-hr inspection. Pilot is Les Hewitt.

M.P.M. Investment Co.'s E-50 Twin Bonanza was in for 100-hr inspection. Pilot, Leo Scheberle.

■ **LEAR, INC.,** Grand Rapids, Mich., installed L-2 Autopilot with Altitude Controller and Approach Coupler in Travelair of Butler Aviation Sales Co.

Oswaldo Lopez, Bogota, Columbia, S.A., had L-2 Autopilot with Alt. Controller and Approach Coupler installed in E18.

Diamond Gardner Co.'s Aero Commander had L-2 Autopilot with Alt. Controller and Approach Coupler installed.

Hoover Ball and Bearing Co.'s Beech D50A received L-2 Autopilot with Alt. Controller installation.

Associated Aviation Underwriters had Super Arcon installed in Beech D50.

Northern Air Service had Super Arcon with directional gyro installed in Cessna 182A, Skylane.

Great Lakes Airmotive's Skylane had Super Arcon installation.

Wallace Lindeman Advertising Agency's Apache had Super Arcon installed.

North Star Bus Lines' Cessna 172 had Super Arcon installed.

Darling Freight Lines' Bonanza C-35 had Super Arcon with directional gyro installed.

Bourbon Ind. had super Arcon installed in their Navion.

■ **PACIFIC AIRMOTIVE CORP.'S** Burbank, Calif., Aircraft Div., overhauled General Petroleum Corp.'s DC-3 fuel tanks. Pilot is Arch McGregor.

Union Oil Co.'s new Convair 440 is flying after installation of extended fuel and oil system, APU, expanded ADI, automatic spark advance, radio and radar, in addition to paint, electrical and numerous other modifications Jim Stevenson is chief pilot and aircraft commander.

The Murray Corp.'s Convair 240 is back at Detroit home base after installation of wet wings and auxiliary oil. Chief pilot is E. C. Spencer.

Westinghouse Electric's B-23, flown by A. C. "Curly" Korb, was in for double engine change, complete paint, removal of wings for inspection and 100-hr. check.

Edgar Bergen's PAC-based Apache was in for a periodic inspection. Charlie McCarthy is copilot.

Max Pray's Twin Beech, piloted by Jean Stroh, was in for double engine change, installation of fuel flowmeters, rotating beacons and stabilizer modification.

Sears Roebuck's California-based DC-3 had 8,000-hr overhaul and installation of Collins autopilot. Pilot is George Fleming; copilot is Paul Caribelli.

D. D. Feldman's Learstar was in for overhaul of Goodyear spot brakes and routine turnaround maintenance. Pilot is John Rich.

Bethlehem Steel's Lodestar is in operation after 100-hr and relicense, installation of radar nose, electrical fuel system and PAC's proprietary retractable dump chute.

Consolidated Western Div., U. S. Steel's Lodestar, crewed by Bill Cloes and Herb Thomas, was modified to install a 100,000 BTU Janitrol heater in the nose.

■ **GARRETT CORP'S AIRESEARCH** Aviation Service Div., Los Angeles International Airport, Calif., completed engine work on LaBrea Securities Co.'s Lockheed Lodestar. Pilots are Tom Penfield and Joe Potter.

General Petroleum's DC-3, pilot Arch McGregor, in for Bendix RDR-1 radar,

Sperry A-12 automatic pilot and change generator system to 200 amps. Airplane licensed for use of AiResearch 26,900-lb gross weight manual.

Texas Co.'s D-18 twin Beech added a safe flight SC-24 speed control system, and a General Electric Gyro Compass System.

H. C. Price Co.'s Douglas B-23, was given an engine change, complete new interior and Winslow oil filter. Piloting were Jack Neal and Bill Hubbard.

■ **GREENSBORO-HIGH POINT AIR SERVICE, INC.,** Greensboro, N.C., completed 100-hr inspection on J. N. Rawleigh Co.'s and Southeast Transport's Bonanzas.

H. L. Coble Construction Co.'s D-50A Twin-Bonanza had custom radio installation including Dare DTR360A, Dual ARC Omnis, ARC ADF, ARC Course Director, Dare Glidepath and transistorized Marker Beacon receiver, ARC T-11. Roscoe Harris is pilot.

D. W. Winkleman-Carolina Co.'s Cessna 195 had 100-hr inspection.

S. & W. Motor Lines' Twin-Beech had miscellaneous engine service. Pilot is L. C. McGehee.

Marsden-Slate's J-35 Bonanza had installation including dual omnis, Mark II Omnigator, Simplexer. Lear ADF.

George E. Sherman Co.'s Bonanza received new interior installation and other service.

Rubber Product's Bonanza was in for new interior, miscellaneous work.

Flight Inc. and **E. A. Robins Veneers** had engine changes on their Bonanzas.

■ **EXECUTIVE AIRCRAFT SERVICE, INC.,** Dallas, Tex., completed annual inspection and miscellaneous repairs to Wm. G. Boyd's Tri-Pacer.

Delhi-Taylor Oil's DC3 had annual inspection, compliance of attach angle bulletin, and misc. repairs. Pilot is Don Beeler.

Union Producing's DC3 was brought in by E. P. "Cotton" Jeter for installation of main gear doors, tail wheel fairing, oil cooler fairing and aileron gap cover kit.

Mene Grande Oil's DC3, piloted by W. (Red) Irwin, came in for installation of 94 engines, Maximizer exhaust system, 200 amp generator system, Janitrol heater with Barber-Colman controls, Airstair and Baggagemaster doors, flush JATO, geared rudder tab, and misc. repairs.

Waterman Steamship's Lodestar was brought in by Bill Correll for new cabin furnishings and materials, including new commissary and lavatory compartments; installation of EAS cockpit fresh air system, cabin picture windows, 200 amp generator system and electric firewall fluid shut-off valves; and aircraft exterior paint.

Sid W. Richardson's DC-3's, piloted by Ed Armstrong and Jim Smith, were brought in for 100-hr inspection, misc. repairs, and installation of aileron gap cover kit.

Circle Drilling Co.'s Cessna 310 was flown in by J. K. Salter for repair of damaged wings, fuselage and landing gear.

Gulf Oil's Lodestar was brought in by Stein Lee for 100-hr inspection, installation of 200 amp generator system, and misc. repairs.

■ **TIMMINS AVIATION LTD.,** Montreal, Que., Canada, installed Maximizer Kit on Avro Aircraft Ltd's DC3. Pilots are Bill Devine and Dennis Young. Also installed was RCA AVQ 10 Weather Radar.

Massey-Harris-Ferguson's Dove had complete interior refurbishing including four custom seats, small divan, custom bar and galley. Spar modification, overhaul and C. of A. renewal done. Pilots are Bill Poag and Fred Van Brussel; chief engineer, Ken Stevenson.

■ **AERO TRADES, INC.,** Ronkonkoma, N. Y., gave Vincent Astor's Grumman G-73 a 100-hr and periodic inspection. Chief pilot is Harold Swift.

Columbia Gas System Service, Inc.'s Lockheed Lodestar had installation of Westinghouse Decelostat Units. Chief pilot is Ben Wrobel.

Joseph James Ryan's North American B-25 had miscellaneous work. Chief pilot is Charles W. Bing.

General Electric Corp.'s Douglas B-23 had miscellaneous work. Chief pilot is Jess Gardner.

Youngstown Sheet & Tube Co.'s Lockheed Lodestar had 1000-hr inspection, X-Ray inspection, complete re-upholstering of cabin lavatory compartment and cockpit interior, complete re-wiring of aircraft and strip and repaint exterior of aircraft. Chief pilot is D. B. McCutcheon.

■ **BAYAIRE AVIONICS, INC.,** International Airpt, Oakland, Calif., completed 100-hr check on radio gear for Judson-

(Continued on page 37)

THE NEW LEAR ADF-12*

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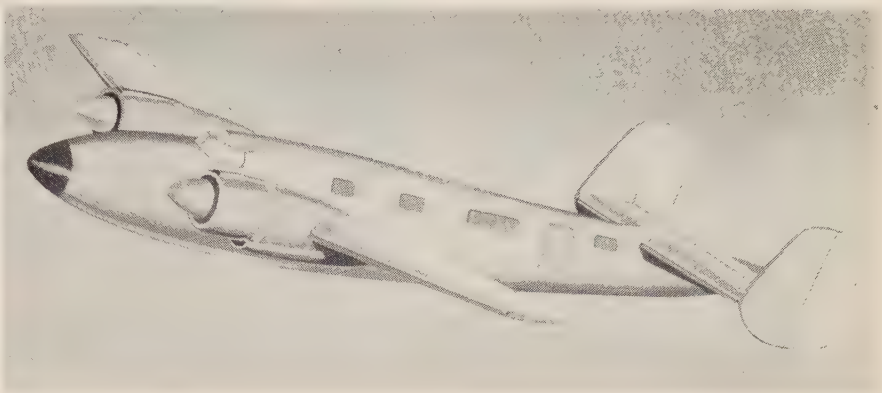
Oakland Airmotive Gets CAA OK For New Executive Aircraft Conversion



Executive conversion of the Lockheed PV-2 Patrol Bomber has been approved by CAA with issuance of a supplemental type certificate to Oakland Airmotive Co. at Metropolitan Oakland International Airport, Calif.

Named the "Centaurus," the plane has a licensed gross weight of 32,000 pounds, with a 280 mph cruising speed. Major airframe changes in the conversion have resulted in outstanding safe flight characteristics with high speed, long range and a useful load carrying capability of more than 13,000 pounds.

Cost of the conversion varies depending on equipment. Ed Gough, Oakland Airmotive president, claims the Centaurus will give more performance at lower cost than any other airplane in the same general size classification.

Airframe modifications include contouring the lower fuselage from nose to tail; new flaps with removal of "bat wings"; modified wing tips and redesigned ailerons; relocated door and large picture windows; streamlined nose section with radar; streamlined propeller spinners; relocated collector rings with short stacks; Janitrol "hot wing" deicing heaters; and other engineering improvements.

With R-2800 Pratt and Whitney 2,000 hp engines and a fuel capacity of 1,350-gallons, the Centaurus has a range of more than 2,000 miles. Single engine minimum control speed at gross weight is 100 mph, and power-on stall speed is 69 mph.

A variety of possible interior designs can accommodate from eight to 14 passengers.

(At press time, it is reported that CAA tests for pressurization have been completed successfully. The first PV-2 to be pressurized, estimated cost will be $150,000. Pressurization will increase altitude and speed range.)

. . . . in the business hangar *(Continued from page 35)*

Pacific-Murphy's Cessna 310.

Standard Oil of Calif.'s Convair had 300-hr radio equipment check. Art Walker is chief pilot.

Prescolite Manufacturing Corp.'s Cessna 310 had L-2 Autopilot with altitude control and approach coupler installed. Pilot is Milan Haven.

L. B. Hill's Cessna 310 received radio equipment check. Pilot is Clyde Sitton.

Columbia-Geneva Steels' Lodestar had re-work of wiring, overhaul and calibration of Magnesyn Compass and ARC CD-1 course director. Pilot is Jim Richter.

■ **L. B. SMITH AIRCRAFT CORP.,** Miami, Fla., performed 1,000-hr inspection and double engine change on Aero Commander owned by Consolidated Purchasing & Design, Inc.

Toni Co.'s Lodestar in for strip and paint and interior alterations.

Associated Air Transport's C-46 converted.

Magnovox Corp.'s DC-3's interior refurbished.

■ **PLANESERVICE,** Van Nuys Airport, Calif., installed a Bolova Radio Altimeter, reported sensitive to readable change of only 10 ft., in C & H Supply Co.'s E-18 Twin Beech for evaluation by Jack Conroy, Chief Pilot.

Buck Blain, owner and operator of Golden Nugget Casino, Las Vegas, was in with his Cessna 172 to discuss operation of ARC-ADF.

Graham Bros. Rock and Gravel Corp., had some radio equipment removed from D-18. Dick Gillespie is chief pilot.

Central Western Co.'s Aero Commander 560 had 100-hr inspection. Pilot is Jim Kenealey.

Edgerton, Germeshausen & Grier, Inc., had Narco Sapphire 360 transceiver and Mark II omnigator installed in its Bonanza.

R. L. Harbison had 100-hr inspection of his Bonanza.

Longley Construction Co. had first 100-hr inspection of H-35 Bonanza.

(Continued on page 39)

Dallas Aero Service

Flight performance of D18S Beechcraft converted with new Hartzell three-bladed propellers and the Safety Performance Kit of Airline Training Inc., Ft. Lauderdale, Fla., was clearly demonstrated to Skyways Magazine.

Homer Penwell, formerly with Aero Design and Engineering, now service manager with Dallas Aero Service at Love Field, is proud of the installation and believes that Twin Beech owners would like to know of the improved performance obtained from the conversion.

Dallas Aero is the first fixed base operator in the nation to make such an installation and Three States Natural Gas' airplane, piloted by personable Frank Buck, made the demonstration.

The original "Safety Performance Kit" was developed and designed by Gordon Isreal, now with PacAero, to increase the safety factor and performance of an already fine airplane. When the Hartzell three-bladed props were added, the results were so dramatic, said Penwell, that he believed a printed report should be made.

Many Twin Beech owners will find the performance figures hard to believe —as we did. Nevertheless, when flying this "new" airplane you are convinced immediately.

With the Performance Kit alone, single-engine, full gross, performance increases from 8-9,000 feet to 12,000 feet and allows the operating engine to stay cooler than normal on a hot day. If looking for additional speed, you can expect an immediate increase of 18 mph indicated, plus an additional 7 mph if the horizontal stabilizer is modified.

The three-bladed props go still further to increase rate of climb more than ten percent with a definite increase in acceleration. Lower noise level is quite noticeable and vibration is eliminated from 1650 rpm through 2300 rpm. This allows longer cruise at reduced power with a higher cruise speed. For example, the standard two-bladed props at 12,000 feet turn 2,000 rpm at 28 inches M.P.; the three-gladed props at 12,000 feet turn 1800 rpm and 26.5 inches M.P.

This reduction in rpm and manifold pressure will reflect longer engine life and considerable saving of fuel.

As Penwell pointed out, seeing is believing. So, Frank Buck was aroused early on a clear, crisp morning to demonstrate the plane which was at full gross weight, including six persons, at takeoff.

Acceleration from start was something this writer had not experienced before. For a minute, I thought I was in a Grumman Mallard. The distinctive whine which marks a Mallard, now was part of this airplane. Flaps were not used at takeoff. The plane air climbed at 1,100 fpm, at 2050 rpm and 30 inches M.P. Air speed was indicating 150 mph. Outside temperature at takeoff was 48 degrees.

Within six minutes we were at 5,000 feet, and four minutes later we were at 8,000 feet indicating 150 mph. At 9,000 feet the plane was leveled. Temperature was 40 degrees, giving a true airspeed of 190 mph at 1750 rpm and 28 inches M.P. This was about 60 percent of maximum horsepower.

At 11,500 feet, Frank told us he would feather the left engine. With carburetor heat on, the right engine indicated 105 mph at 2150 rpm and 25 inches M.P. The plane held this altitude with no difficulty demonstrating its capability of continuous flight, if necessary, with complete ease and security.

With both engines operating again, we climbed to 14,500 feet at 500 fpm, indicating 150 mph at 2100 rpm and pulling 24.5 inches M.P. Outside air temperature was 20 degrees.

To erase doubts that the engines might be "souped up with blowers," the plane had standard P.W. 450 hp engines.

At this point it can be said positively that had I not seen this performance, I would not have believed it. Noise level and vibration was noticeably low, making normal conversation in the cabin a pleasure. We were climbing at 400 fpm. At 20,000 feet we leveled off. Frank put the Beech on its step which produced an indicated 155 mph, or a true airspeed of 205 mph. Engines were at 2100 rpm using 19.7 inches M.P. Outside air was —2 degrees.

The pilot said that the plane could "easily go to 22,000 feet" where it would indicate 140 mph. Time didn't permit this further demonstration, but I was convinced that if Buck said so, then it was so.

For D18S owners who are interested in increasing speed, altitude, performance and safety, Dallas Aero Service will provide the answers.

Another DAS project is the modification to their "Lockheed Speed Up" program consisting primarily of adding a streamlined tail cone.

This involves modifying elevators to remove the center section where the tail cone connects and installing a stabilizer closure. Flap traps have been cut considerably and knob protrusions at wing ends have been removed.

Wing modification saves 38 pounds and results in a knife-edged trailing edge. This adds 8-10 mph speed.

This modification is in addition to Dallas Aero Service's original Lodestar program which consists of increased angle of incidence on horizontal stabilizer, closing gap between elevator and stabilizer, installing saddle back fairings, removing bat wings, installing short stabilizer tips and installing knob fairings.

Effect of the two modifications increases speed about 20 mph, gives better stall characteristics, gives better control under icing conditions, increases over-all stability, improves flight handling characteristics including single-engine performance and rate of climb.

Combined modifications cost approximately $7,650.

in the business hangar

(*Continued from page 37*)

Pacific Automation Products Co. had 100-hr inspection of its E-50 Twin-Bonanza. Pilot is Ray Cote.

Precipitation Control Co.'s Boeing 247 had installed long-range Narco Sapphire Transceiver and another ARC Omni system.

Frank Belcher's H-35 Bonanza had 100-hr inspection.

H. L. Mears' D-17S Beechcraft had Narco VC-27 and VOA-2 installed.

Phil Schuss flew his Bonanza in for 100-hr inspection.

George Messall had first 100-hr inspection on his H-35 Bonanza.

■ **PIEDMONT AVIATION, INC.,** Winston-Salem, N.C., performed 100-hr inspection on DC-3 owned by R. J. Reynolds Tobacco Co. Pilot, Herb Drew. E18S was in for installation of radar and miscellaneous repairs.

Miller Equipment Co. had 100-hr inspection on H-35 Bonanza.

Alex Fulks' H-35 Bonanza had Tactair Auto Pilot installed.

Diamond Alkali Co.'s DC-3 had short stacks, 4,000-hr inspection, heater modification, new paint job and new rug. Pilots are Roy Black and Tony Desilvia.

Tennessee Eastman's DC-3, flown by Leo Boyd and Ralph Bailey, had new brakes installed and a 100-hr inspection.

CAA's DC-3 had heater system modification and re-work of automatic controls.

Noland Co.'s Lodestar, flown by Carl Styne, had 100-hr inspection.

Dept. of State Police, Richmond, Va., had 100-hr inspection on their Apache.

Hanes Hosiery Mills' E18S, flown by Frank Groat, was in for 100-hr inspection.

Thomason Plywood Corp.'s D18S had 100-hr inspection, engine change and miscellaneous repairs.

■ **REMMERT-WERNER, INC.,** Lambert Field, St. Louis, Mo., completed installation of Bendix X-Band radar, Sperry A12 automatic pilot with extra gyrosyn compass and H6 electrical gyro horizon, Collins 51X2-17L7 880 channel VHF communications, dual Collins 51X2-344B omni navigation system with dual RMI radio magnetic indicators and dual 51V glide slope receivers, dual A.R.C. 21 lightweight ADF radio compasses, custom radio and instrument panel and lightweight landing gear cover doors on Pillsbury Mills' DC-3. Pilot is James Grogan.

Mead Johnson Co.'s DC3 had installed new special swivel chairs and new interior fabrics during a double engine change. Pete Beard and Ed Floel are the pilots.

S. M. Scaife's DC3 had new R-W lightweight landing gear doors installed at Pompano Beach Airport, Fla., during an annual relicense. Jim Leonard and Ralph Rathgeber are the pilots.

Lauhoff Grain's D18S had the cabin enlarged by removal of the rear bulkhead during a 100-hr inspection. Bob Burke is the pilot.

Webb-Knapp's DC-3 came in for an 800-hr inspection and overhaul, new control cables, new airstair door, new exterior paint and installation of R-W lightweight landing gear doors. Donald Gex, Don Alexander and Bill White are the pilots.

Business Flying Center

(Continued from page 20)

is a part, represent the largest expenditure for business flying that has ever been made in the history of the industry. The new aircraft service site is a 35-acre plot on the southeast side of Love Field, leased from the city of Dallas. Plans include a 700-foot long stretch of new hangars, terminal building, and adjacent shop areas, all set in a two-acre concrete ramp. A 400 foot by 80 foot storage hangar area will handle any size aircraft up to a Lodestar. Plans have started for an air-conditioned building to house the distribution division and general offices. Completion of the hangars, two of which will be finished this spring, will permit basing of 200 planes in the facilities.

The quarter-of-a-million-dollar business flying terminal is in keeping with Southwest Airmotive's habit of doing things on a grand scale. The distribution department of the company handles a long list of distributorships for some of the big-name products in aviation: AC, Goodrich, Bendix, Hamilton-Standard, Lycoming, Delco Remy, Aeroquip and others. So large is this end of the business that branch distributor sales offices have been established in Denver and Kansas City, with a resident representative in Tulsa. The Sales Office moved into the old airline terminal building on the field when the airlines moved to new facilities at Love Field.

The engine overhaul division, a large part of the SAC operation, recently overhauled its 10,000th Air Force engine since World War II. This side of the business is of interest to aircraft owners seeking good engine overhaul work. The company has had extensive experience on all makes of engines. In 1955 Southwest Airmotive was awarded the first Air Force contract for jet engine overhaul by a non-military, non-factory facility, and the following year the Navy followed suit with another jet overhaul contract. Aside from the military engine overhaul work, SAC specializes in overhauls for private and business aircraft of every type.

Approximately 30 percent of the firm's business is with the military with 70 percent catering to business aviation.

The company has a string of Texas-sized statistics to its credit. It sold 6,000,000 gallons of gasoline last year and is the largest user of aviation gasoline in the country aside from the military and the airlines. Five thousand gallons of aviation oil are maintained in storage. The company grossed over $9,000,000 last year, employing over 800 persons. When the $4,000,000 expansion

(Continued on page 55)

AT IOWA FALLS, L-M "Flying Farmer" lighting was installed in two days by volunteer help of the flyers using the airport. Cost was partly paid for by the Iowa Aeronautics Commission. Complete equipment for a 2,000-foot runway such as this one costs only $665.

What Flyers Say About Iowa Falls

Goes For All Of Iowa's "Flying Farmer"-Lighted Airports

"He was ready to push the 'panic button' when he saw the lighted runway . . ." An Iowa airport director tells of an Iowa pilot lost at night during a storm, almost out of fuel, and desperate, who was saved by a $665 string of runway lights at a municipal airport. This is only one of many successful landings by pilots lost at night or having mechanical trouble.

The Iowa Commission's state-aid program has resulted in increased night flying, more business flying, greater plane utilization, and good will for the towns with these all-night-lighted runways.

Iowa Falls is one of 30 Iowa cities with L-M "Flying Farmer" runway lights. Here is what some Iowa businessmen say about it. *John L. Butler*, Eldora lawyer: "The runway lighting at Iowa Falls and other airports, including Eldora, gives a feeling of security and adds to the utility of the plane." *Paul I. Barker*, insurance agent and secretary of Scenic City Flying Club: ". . . very reassuring after dark . . . a fine ad for our town."

Jim Young, Iowa Falls district supervisor for Iowa Electric Light & Power Company: "Gives me a longer day and a much safer one . . . Line Material's small field packet is a very adequate lighting scheme. The cost with the commission's help was well within our reach."

"Flying Farmer" kits were developed for small airports and taxiways of larger ports by Line Material, pioneer designer of airport runway lighting equipment, including high-intensity controllable beam lighting used at most of the largest airports in the country. Mail the coupon for article on Iowa plan by Frank Berlin, Director, Iowa Airport Commission and folder on the "Flying Farmer" kits. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

"Flying Farmer" Kit Only 33¢ Per Foot!

You can have a "Flying Farmer" kit for a 2,000-foot runway for only $665. This includes 18 clear lights for runway, 12 green threshold lights, yellow cones, lamps, stakes, 10,000 feet of wire, 30-amp switch. Only 33¼¢ per runway foot—amazing value! Also 2,500-foot runways at $775; 3,000-foot, $885. For runways, landing strips, taxiways; greatly increase the use of your plane and your airport. Mail coupon for information and order blank.

336

MAIL THIS COUPON TODAY

LINE MATERIAL INDUSTRIES, Milwaukee 1, Wisconsin

Please send free, copy of the Iowa plan article, a "Flying Farmer" folder, and order blank. **SK58**

*Name*_____

*Business*_____

*Address*_____

*City*_____ *State*_____

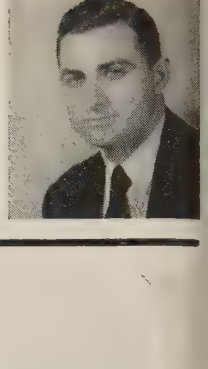
LINE MATERIAL Industries

McGRAW-EDISON COMPANY

LM Airport Lighting

McGRAW EDISON

SAFETY DIGEST



RICHARD W. GROUX, *Assistant to Executive Director NBAA*

Compiled and edited from leading air safety publications issued by military, naval, airline, government agencies and from private and business pilots' experiences.

Runway Shorthand

With apologies to Mr. Gregg, well known for his shorthand system, runway markings and airfield lighting have something in common with his hooks and squiggles; both impart a meaning through signs and symbols. The catch is that even though you know it is shorthand, if you can't read it, you won't know what it means. The same goes for light patterns and painted symbols around an airfield.

Every pilot gets acquainted with airfield lighting and marking very early in his flying career. However, since there is no single publication dealing with the subject from the pilot's viewpoint, an individual's knowledge may, through no fault of his own, end with just an acquaintance.

Too, there are different runway marking and approach lighting systems in use today. In this age of lower instrument minimums and higher performance aircraft, with distance and reaction time compressed into smaller and smaller chunks of time, familiarity with the different systems is as important as knowing that markings and lighting exist.

Study of airfield lighting and marking is easier if the subject is broken into three separate elements; runway markings, airfield lighting and approach lighting.

Runway Markings: A-N-C-

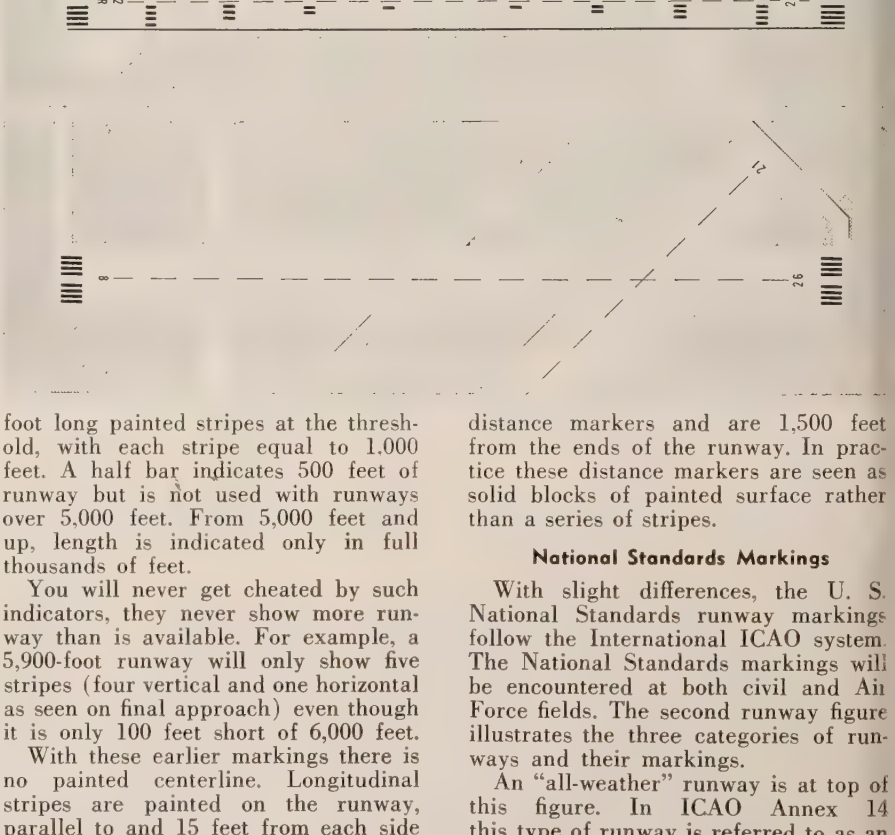
Once you could head toward an unfamiliar field and feel sure of finding the type of runway markings shown in view below. It was a joint system in use by Air Force, Navy and CAA and was in effect until several years ago. Now outmoded by new marking standards, the system is still found at a few USAF, Navy and CAA Fields.

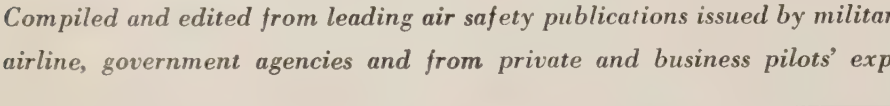
Runway length is indicated by 50-foot long painted stripes at the threshold, with each stripe equal to 1,000 feet. A half bar indicates 500 feet of runway but is not used with runways over 5,000 feet. From 5,000 feet and up, length is indicated only in full thousands of feet.

You will never get cheated by such indicators, they never show more runway than is available. For example, a 5,900-foot runway will only show five stripes (four vertical and one horizontal as seen on final approach) even though it is only 100 feet short of 6,000 feet.

With these earlier markings there is no painted centerline. Longitudinal stripes are painted on the runway, parallel to and 15 feet from each side of the runway center. They begin and end 25 feet from the numbers at each end of the runway.

The markings appearing as a series of broken stripes down the runway from the approach end are intended as distance markers and are 1,500 feet from the ends of the runway. In practice these distance markers are seen as solid blocks of painted surface rather than a series of stripes.





National Standards Markings

With slight differences, the U. S. National Standards runway markings follow the International ICAO system. The National Standards markings will be encountered at both civil and Air Force fields. The second runway figure illustrates the three categories of runways and their markings.

An "all-weather" runway is at top of this figure. In ICAO Annex 14 this type of runway is referred to as an "Instrument runway served by precision approach system." Most prominent parts of this marking style are the groups of longitudinal stripes along the first 2,000 feet of runway. These groups are 500 feet apart and serve partly to indicate the position of the aircraft along the runway. The primary name for them is touchdown zone markings.

The eight bars indicating a threshold are 12 feet wide and extend a minimum of 150 feet down the runway. Five hundred feet from the end of the runway is the first of the touchdown zone markers, also a group of eight bars. There is little likelihood of mistaking one for the other as the touchdown zone markings are six feet wide and 75 feet long.

In the National Standards markings, the centerline is the same as the Navy markings; 120-foot dashes and 80-foot spaces. Width of the centerline must be at least three feet and the ICAO manual notes that widths up to 10 feet have been used.

Runway side stripes are also in-

cluded in the all-weather markings. These are three feet wide and will normally be 70 feet from either side of the centerline. If the runway is 150 feet wide or less, the side stripes will have their outer edges approximately on the edge of the runway.

Other drawings in the second figure concern "instrument" runway and "all other" (or VFR) runway markings.

Other Markings

Air Force runways have additional touchdown markings in the form of three-foot wide yellow stripes placed across the runway some 2,000 feet from either end of the runway. Also, there is a runway midpoint marker consisting of two bands of paint, two feet wide, extending across the runway.

On some runways with paved overruns the areas are marked either with yellow chevrons or stripes across the area. With either type markings it becomes a non-touchdown area. At Air Force bases, many of these areas are officially labeled blast pads; primarily used to prevent erosion of runway ends from prop and jet blast. They are made of highway paving material about two inches thick and do not have runway bearing strength.

Those familiar numbers at the end of all runways indicate the direction of the runway but it might be of interest to remind you that they are magnetic directions—just as the local surface winds given by the tower are magnetic directions.

Runway & Taxi Lighting

There are, of course, three basic colors for runway and taxiway lights. Green for threshold, white for runways and blue for taxiways. At certain fields, red lights may be used to mark the overrun area.

Navy standards for distance between runway lights are generally in agreement with other aviation standards. BuAer's "Planning Standards for Air Stations" notes that spacing of runway marker lights shall approach but not exceed 200 feet and can be installed as close as 70 feet to reduce a large gap in the lighting pattern of an intersection.

On runways with semi-flush lights there is a split color (yellow and white) which acts as runway distance markings. These split-color lights are located at both ends of the runway for a distance of 1,500 feet. The yellow portion of the light will be seen only on the last 1,500 feet of available runway during takeoff or landing. High intensity lights do not have this split color feature. At civilian fields yellow runway lights will be seen on the last 2,000 feet and indicate the "auction zone."

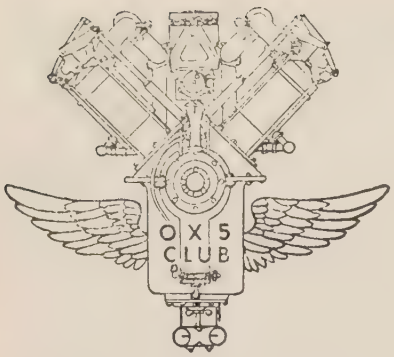
Taxiway lights shall be located a uniform distance, preferably two feet, outside the paved or marked edges of taxiways. On runways which are also used as taxiways, the blue lights shall preferably be five feet outside the paved or marked edges (but not closer than two feet to the line of runway lights).

Here is an item which might be new to some pilots. Two blue lights spaced five feet apart and placed on each side of a taxiway entrance into (or exit out of) a runway or parking apron are called "entrance-exit" lights. Next time you are using the threshold lights to estimate the runway turnoff, look for those two blue lights close together. Caution: a background of taxi-way lights can confuse the issue so you have to be relatively close to the turnoff to make an accurate identification of the entrance-exist lights. One final note on this: these will not be found at intersections of taxiways or at locations that are not normally runway entrances or exits.

Threshold lighting (those welcome green lights marking the beginning of the runway) is something of a problem when trying to find the standards associated with it. At one time threshold lighting consisted of a minimum of four green lights spaced across the end of the runway. Present day practice is to leave the center of the runway clear and to group the lights to each side of the runway, forming in effect two green bars.

The ICAO annex says threshold lights shall be equally spaced between the lines of runway lights or arranged in groups near the lines of runway lights. The minimum number of lights shall be at least four, with one light in line with each line of runway lights.

(Continued on page 46)



By Russ Brinkley, Pres.

May will be, as usual, the busiest month of the year for the OX5 Club, with organizational, charter and anniversary meetings planned by state wings from New England to California. This is a reminder that, in the early days of flying, it was usually the early part of May when plane owners started retrieving their stick-and-wire kites from barns, lofts and corncribs. They cleared out the bird nests, pumped up the tires, replaced shock cord and frequently patched wing holes with handkerchiefs or shirt tails. A day of work—an hour of flying.

Only a few OX5 powered planes will actually be tuned up this year, now that the once-proud engine has been reduced to the size of a lapel pin. Nevertheless, the pioneer flyers will be out in great numbers, if only to talk about their long remembered crackups, forced landings and the time they won the spot landing contest at the Boondocks air meet.

May wingdings will bring together many friends who have been out of unity, in some cases for as long as 40 years. One OX5 party is pretty much like another, no matter how many modern attractions may be injected. Once the food is consumed and the last speaker has taken his bow, the assemblage breaks up into small cliques, in search of a convenient corner, where the conversation turns quickly to the era when a swallowed valve, a broken tail skid or a frozen water-pump, were all part of the pilot's worry.

By the end of May, OX5 officers hope to have completed the organization of all state wings. Some states, still to be organized, had few OX5 aircraft because of high elevation. Fortunately, OX5ers from other states have changed residence, and it will be the newcomers who make up state membership.

One airplane remembered in every state, is the Alexander Eaglerock, built in Colorado and designed to operate at high elevations. In mountain country, the Eaglerock will be remembered for its ability to get off and climb, regardless of field elevation. Those same long Eaglerock wings posed many problems as to floating characteristics when certain pilots were engaged in becoming used to them, at airstrips nearer to sea level.

COVER EXPLANATION:

Reading Gathering Next Month

On the cover are some award winners of the Reading Aviation Meeting of the past two years.

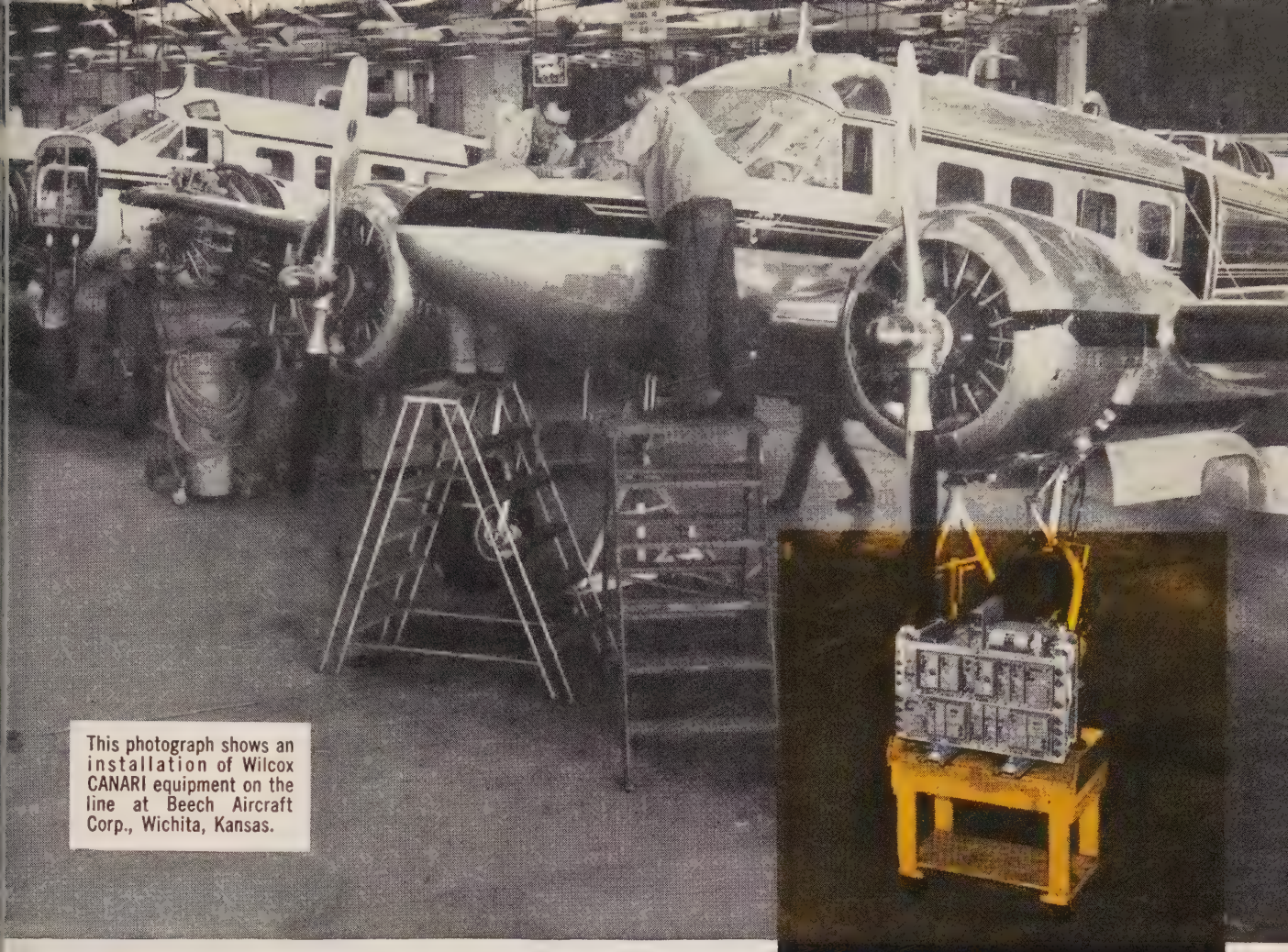
Clockwise from the top, identification of the pictures is: Alcoa, DC-3, 1956 Flagship, from left, Dave Flannery, chief pilot, William Smouligny and William Abbott; National Dairy Products, DC-3, 1957 Flagship, from left, W. G. Reichman, maintenance chief, William R. Strong, chief pilot, and John Hellebrand, copilot; Kewanee Oil Co., Beech D-18S, Best Twin Engine 5,000-12,000 lbs, 1956, Frank Auernig, left, pilot, and Skip Wittner, chief pilot; RCA, Cessna 310, Best Twin Engine Under 5,000 lbs, 1957, Ed Chatterton; Bonanza, Best Single Engine, 1956, R. W. Danielson; Cessna 182, Best Single Engine, 1957, Ed Chatterton.

The ninth annual meeting is June 6 and 7 at Reading Municipal Airport, Pa.

Flottorp Moves To Florida

Flottorp Manufacturing Co. has moved its headquarters to the Hood Building, Wilson Road, Dunnedin, Fla., the firm announced.

The entire manufacturing, overhaul and repair facilities of the propeller company were moved from the former headquarters at Grand Rapids, Mich.



This photograph shows an installation of Wilcox CANARI equipment on the line at Beech Aircraft Corp., Wichita, Kansas.

No Wait No Worry No Waste . . . with Factory Installed *wilcox* CANARI Equipment in Your Business Aircraft

When you select and specify a Wilcox CANARI system for your communications and navigation equipment, it can be installed at the factory as your craft comes down the assembly line. There's no waiting for installation of this vital equipment after delivery of your plane. Your plane is ready to fly away when it comes off the line . . . ready to go wherever you want to go in any type of weather.

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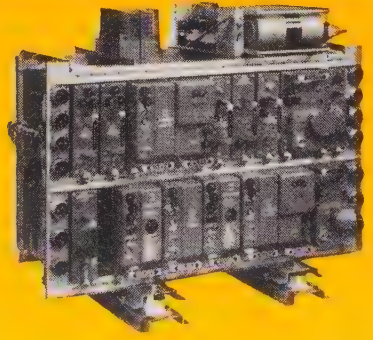
Consider these major advantages of factory installed Wilcox CANARI equipment when purchasing your business aircraft.

Also, remember Wilcox CANARI equipment is CAA Certificated and has been proved in use in hundreds of airline and business aircraft. It's pretested, in the rack, at Wilcox before it is shipped to the factory or dealer. It's reliable . . . dependable . . . easily maintained. It's produced by the pioneers of light-weight, small size airborne equipment. It's the equipment you've been waiting for . . . it's Wilcox.

Wilcox CANARI Equipment Can Also be Purchased, Installed and Serviced at any one of the 34 Authorized Wilcox Dealers throughout the nation.

Circle No. 28 on Reader Service Card



Write, wire or phone for more details on a factory or dealer installation of Wilcox CANARI Equipment for your aircraft . . . or see your nearest Wilcox dealer. No obligation, of course.

wilcox

ELECTRIC COMPANY, INC.
Fourteenth & Chestnut St.
Kansas City 27, Mo., U. S. A.

Safety Digest

(*Continued from page 43*)

One ICAO recommendation is that the lights be arranged to show simultaneously at both ends of the runway. Presumably this would mean a pilot just touching down should be able to see the threshold lights on the other end of the runway.

For runways more than 100 feet wide, the U. S. Civil Standard requires each group of threshold lights to contain not less than four lights. This standard also notes that the outermost threshold light in each group shall be located in line with the rows of runway lights. Where there is usable overrun area at the end of the runway, elevated threshold lights, if used, may be located outboard of the runway lights. In such case the innermost light of each group of elevated threshold lights will be located in line with the corresponding row of runway lights.

Thus at civil fields the threshold lights may appear to be outside the runway lights indicating there is a usable overrun; if inside, there is no overrun (Helpful information only if you are wondering whether your landing rollout will end in the boondocks or overrun.)

Approach Lighting

At present, electronic landing systems (GCA and ILS) are actually landing aids. They bring the aircraft into close position to the runway but the final act of landing must be carried out by the pilot. With the visibility and ceiling minimums now in use, approach lights are helpful in providing final alignment with the runway.

These lights extend from the runway threshold out into the approach zone for a distance of 1,000 to 3,000 feet and usually constitute the pilot's first visual contact with the ground during a low visibility approach.

The primary purpose of this article is merely to review the systems which a pilot may find at airfields in the U. S. This qualification is important when discussing approach lights; the question of which system is best has been as controversial as the hem line at a Paris fashion conference.

There is general agreement that approach lights are nice to have. But the agreement usually stops there—as it has been estimated that a dozen different systems are in use in the U.S.

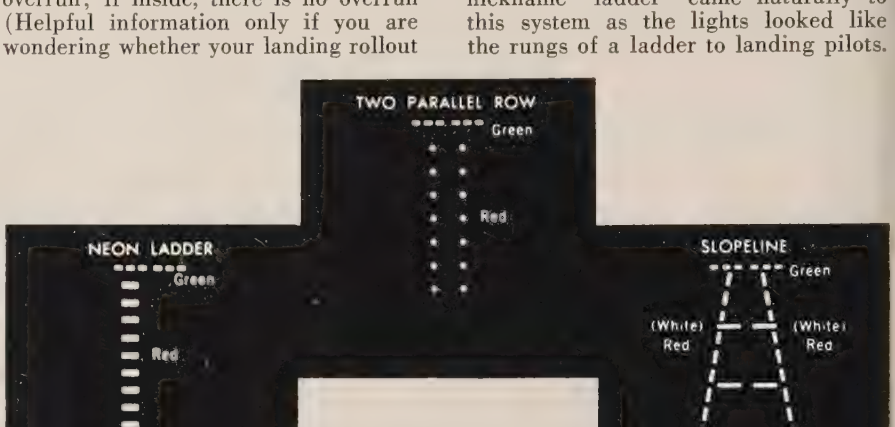
A safe distance from the bonfire, reasons for the varied systems appear reasonable. One is economy. Approach lights are an investment which must last many years, thus there is a reluctance to exchange one system for a new one which itself may be obsolescent in a short time.

Second reason for disagreement over a preferred system concerns organizations which have greatest interest in all-weather flying: airline pilots, Air Force and Navy. Here, due to types of aircraft being flown, basic differences of opinion have appeared.

As a result, three systems have been adopted as the "National Standard" for approach lighting.

Early Approach Lights

In the late 1930's an approach light system was installed at Newark. Red neon proved satisfactory for penetration of fog and smoke and did not produce a glaring light. A series of these lights were placed, as an extension of the left runway lights, for a distance of 1,500 feet into the approach zone. The nickname "ladder" came naturally to this system as the lights looked like the rungs of a ladder to landing pilots.



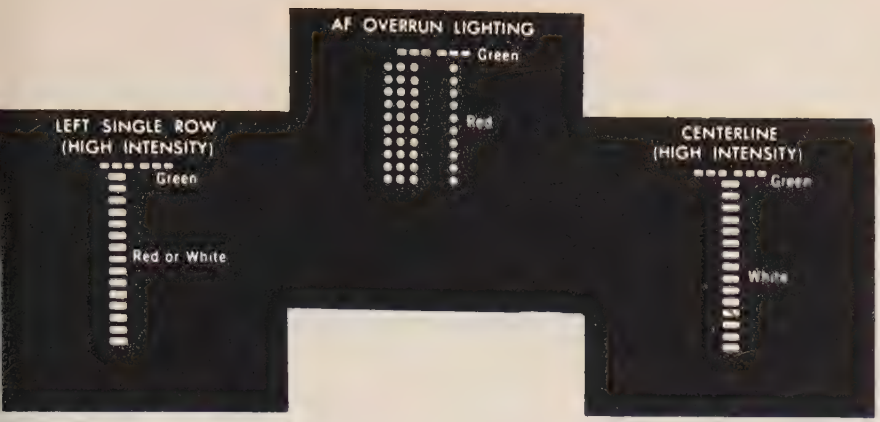
Dissension began almost immediately. A 1938 report says because of poor visibilities that so ferquently prevail at Newark, a movement is on foot to have these neon approach lights extended out half-way from the end of the runway to the range station.

The *Neon Ladder* system of approach lights was in wide use at civil fields in the U. S. by the time of World War II and continues as a major civil system.

In the early 1950's the Air Force adopted the *Overrun* system of approach lighting. It is essentially a *Two Parallel Row* system, red lighted, extending 1,000 feet into the approach zone. The left row consists of triple lights with a single row on the right side.

Three other civil systems will be found in limited numbers in the U.S. One is the *Slopeline* system which was the nominal U.S. standard from 1949 through 1953. Only four remained in service by 1955. The other is the *Left, Single Row, High Intensity* system.

When the airline pilots objected to the slopeline, the left single row was adopted as a compromise.



The left single row consists of bars f white lights, flat on the ground, laced out into the approach zone as an xtension of the left row of runway ights. Two of these installations had ed lights instead of white.

Third system in limited use is the *enterline (High Intensity)*. The light ources are the same as the left single ow and are simply an extension of the unway centerline. NAS Miramar is isted as having this system.

National Standard "A"

U. S. Standard A is the present civil ystem. It consists of white slopeline ars, 100 feet apart, flat on the ground, xtending 3,000 feet into the approach one. Like the high intensity centerline ights, these form an extension of the unway centerline. At 1,000 feet from he threshold there is a "crossbar" of white lights. This crossbar extends 50 feet on either side of the center row of lights and gives roll guidance plus distance information.

A line of red terminating lights appears just before the threshold is reached. Red "wing" bars are also seen before each group of threshold lights.

STANDARD "B" is the Air Force version of the national standard. It is basically the older Air Force Overrun system with a red lighted centerline extending into the approach zone. At 1,000 feet from the threshold where the red centerline ends, there is a red cross bar. Depending upon space available in the approach zone, the red centerline lighting will be at least 500 feet long and may extend up to 2,000 feet. Although this is the Air Force system, it will be found at some civil fields.

STANDARD "C" is the Navy system for National standard approach lighting. It has the features of the slopeline system with the centerline style of the British Calvert system (single lights instead of bars). The only one in operation is at NAS Patuxent River.

Recent Developments

This discussion of approach lighting would not be complete without mentioning the use of centerline stroboscopic flashers. Both Idlewild and Newark in the New York City area have them and the Air Force tested them at March AFB. Calif.

The flash system has so far been used with Standard A approach lighting. The strobe units are located at each of the first 20 white centerline bars at Newark and Idlewild, leaving the last 1,000 feet to the threshold with just the centerline bars. In the March installation the strobeacons are brought to within 100 feet of the threshold.

Each strobeacon emits a brilliant flash of 30 million candlepower twice a second in a specially timed sequence. The flash is non-blinding, it lasts only 1/3000th of a second, and by flashing in sequence the effect is like that of blazing balls of fire rolling at 2,600 mph toward the runway threshold.

In tests at March AFB the strobeacon light was reported seen at a distance three times that of reported visibility.

For example, when pilots reported one mile visibility, the strobeacon light was normally sighted at three miles.

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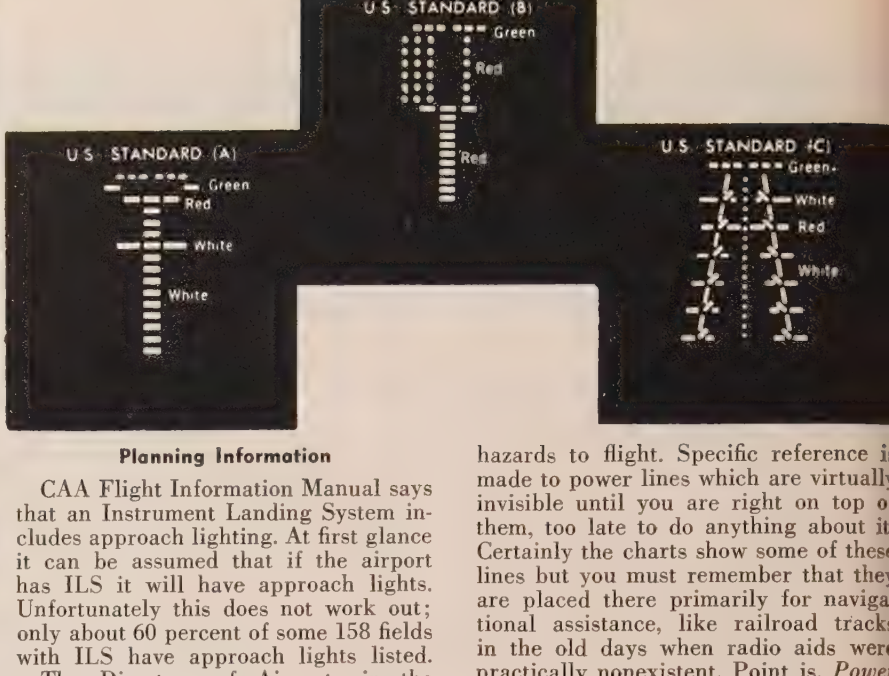

Planning Information

CAA Flight Information Manual says that an Instrument Landing System includes approach lighting. At first glance it can be assumed that if the airport has ILS it will have approach lights. Unfortunately this does not work out; only about 60 percent of some 158 fields with ILS have approach lights listed.

The Directory of Airports in the Radio Facility Charts is one place to learn if a field has approach lights. Under the "Lighting & Svcg" column, "L5" means approach lights of the neon ladder type. "L7" indicates high intensity approach lights.

Best source concerning what type of approach lights a particular field might have is the letdown plate in the Pilot's Handbook. Look at the drawing of the field layout in the lower right hand corner. The approach lighting system will appear as a miniature coded drawing at the end of the runway having the approach lights. For the meaning of this code, look in the first pages of the Handbook.

On fields showing *Left Single Row, High Intensity*, it is best to crosscheck with the RadFac Directory of Airports as some letdown plates show white high intensity lights (L7) but are listed in the Directory of Airports as L5 (amber neon ladder). Information in the Directory of Airports is considered later and more correct. At minimums it could be disconcerting to expect one color but see another.

Until such time as there is agreement on the most desirable system of approach lighting, pilots will be faced with various types when flying in the U. S. This state of affairs will continue for some years, even after a single system is chosen as a National Standard, due to the factor of economy.

Thus to obtain maximum assistance from runway marking and approach lighting, a pilot must be familiar with all systems. It might serve to repeat an earlier statement. Being familiar with the differences is just as important as knowing that the markings and lighting exist. Approach—USN

Flying Low

In regard to planning, we have had several instances where far too much reliance was placed upon sectional and regional aeronautical charts to show hazards to flight. Specific reference i made to power lines which are virtuall invisible until you are right on top o them, too late to do anything about it Certainly the charts show some of thes lines but you must remember that the are placed there primarily for naviga tional assistance, like railroad track in the old days when radio aids were practically nonexistent. Point is, *Powe Lines* are not printed on charts as haz ards. It is assumed by chart designer that majority of flights proceeding VFF will be above 500 feet terrain clearance

This means that only the most out standing visual aids to navigation wil appear. Obviously if every prominen feature and low level obstacle in th vicinity of a large metropolis were t be printed, there would be room fo nothing else, and the chart would be horrible mess of criss-crossing line dots, circles, lettering, etc.

Put bluntly, don't excuse yoursel from actually going out and surveyin a prospective low level navigation rout from a *prudent* altitude just because a air chart fails to show obstacles.

Next issue causing numerous com plaints in low level flights is the us of ground radio facilities as chec points or turning points, specially radi facilities serving busy airports. We ca only re-emphasize the fact that tower have enough trouble keeping track o incoming and outgoing traffic from thei fields without having to worry abou formations of low flyers suddenly ap pearing and flashing by at great speed

The problem is complicated by th increasing employment of high per formance jet aircraft which operat from these fields. They need a long lo approach and consequently traffic pa terns have become much wider. Wha was once a generous clearance aroun an airport is no longer enough. Suc fields (particularly military) must b given a wide, wide berth.

(Editors Note: Hazards involved in lo level flight are not restricted to th military. Within the last month tw multi-engine business aircraft were to tally destroyed. One was operating a a very low level during marginal weath er conditions in a mountainous region— and hit the crest of a ridge. The othe struck a power line while investigatin a possible river crossing point fo ground equipment.) Approach—USN

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THOROUGHLY PROVED—2000 IN USE DURING EIGHT-YEAR PERIOD	✓				
CAA-CERTIFICATED FOR ALL LEADING AIRPLANES, S.E. & TWIN (19 MODELS)	✓				
YAW DAMPING	✓	✓			
VISUAL DIRECTIONAL & ATTITUDE GYRO REFERENCE	✓		✓		✓

This tabulation of essential autopilot features was gathered from manufacturers' specifications, current as of September 15, 1957

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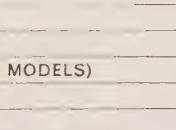
LEAR L-2  AUTOPILOT

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CANADIAN REPORT / North of the Border

By R. J. Childerhose

Executive Aircraft Handles Aerial Photo Survey Job

ABOVE OTTAWA *this Spartan Air Services Cessna 310 is rigged for air photo work.*

A contract held by Spartan Air Services Ltd., of Ottawa, for aerial photography in the Caribbean has been extended to cover sections of the Bahamas group. A Cessna 310 aircraft, specially modified for aerial photo work, will soon move from Port-of-Spain, Trinidad, to Nassau with its three-man crew.

Under the extended contract which was awarded by the Directorate of Overseas Surveys of Great Britain, three islands in the Bahamas will be photographed in three different scales. The three islands are: New Providence, Eleuthera and Cat Island.

Spartan crew members on the project are: pilot Gordon Yewen, navigator Harry Bradley and camera operator Ed Kozystko, all of Ottawa. Earlier this winter, the same crew flew on photographic missions over Trinidad, British Guiana and Colombia.

Record Year For Canadian Airports

The year 1957 set a new record for Canadian airports in terms of landings and takeoffs, according to figures just released by the Department of Transport. It is interesting to note that the larger portion of these arrivals and departures are made by single and twin-engine light and executive type aircraft.

During the year there were 2,838,066 landings and takeoffs at the 27 airports with DoT control towers, an increase of 26.6% over 1956.

For the second year in a row, Vancouver led all others in number of landings and takeoffs—306,113; Montreal's Dorval Airport had 257,086; followed by Cartierville with 229,245 and Ottawa 228,847.

During February of this year, Vancouver's control tower recorded some 20,262 landings and takeoffs, making it the busiest field in Canada for that month. Second place went to Ottawa with 15,304; followed by Saskatoon 14,602 and Montreal with 14,490. The total number of ups and downs in Canada for that month was 189,347—an increase of 3% over the same month last year.

Business Aircraft Facilities in Toronto

Timmins Aviation Ltd., well-known Montreal business aircraft firm, last month inauguerated an Aviation Fuel Service at Toronto's Malton Airport.

Manager of the Malton operation is Stewart W. Irvine, TAL's Toronto Sales Representative. The new service is handled by the latest in equipment, including modern mobile refuelling tenders and the familiar Timmins' Courtesy Wagons. This up-to-date station wagon service provides transport from the visiting executive's aircraft to Customs and/or downtown.

Record Number of Pilots in Canada 1957

The number of pilot licenses of all types in force in Canada at the end of September 1957 showed an increase of nearly 1,600 over the corresponding total at the end of 1956.

A breakdown of the total reveals that the bulk of the increase was in the private pilot category, which jumped 1,008 from 6,580 to 7,588. Commercial licences also showed a healthy increase, rising 401 from 2,145 to 2,546.

Other categories were as follows (with 1956 totals in brackets): Senior commercial 422 (380); airline transport 946 (831); and glider 278 (246).

The number of licenced airports in Canada also continued on an upward trend, with 547 being registered at the end of September 1957 as compared to 519 a year previous.

Re-organization Within DoT

Re-organization of the Civil Aviation Branch of the DoT, as well as the appointment of necessary personnel, has been announced. In this re-organization, three senior positions at headquarters were created.

The announcement says that accident investigation has grown so in complexity and importance, that a separate organization of specialists in the field has been formed. C. T. Travers, present Controller of Civil Air Regulations Div under which this work has been conducted, has been appointed Chief o the new division of Accident Investigation.

A new division called Civil Air Operations & Regulations has been created under M. M. Fleming to consolidate the functions involving departmental and civil flying operations, airways functions, flight operations and civil air regulations.

The rapid growth in the extent and complexity of airport facilities operated by the DoT have made it necessary to form a separate unit to be known as the Airport & Property Management Division. Head of it will be Earl Hickson.

Airport On B.C. Island

A new and expensive airport is being built to serve the northern west coast city of Prince Rupert. The field is being hacked out of rock and muskeg on nearby Digby Island, a 10-minute boat ride across the world's third biggest natural harbour. (Rio de Janeiro and Sydney, Australia, are first and second.)

The airport's 6,000-foot runway, access road, terminal buildings and ferry dock are scheduled to be completed by fall 1959. Initial cost of the strip is $7,250,000. Transport Minister George Hees terms it "the most costly airport in Canada."

To build this facility, men and machines have been battling against monumental problems. Lack of rock for the access road, and acres of muskeg across which the heaviest machinery had to be moved have provided successive challenges. At time of writing, the ferry dock is complete and fuel storage tanks are in place. The access road is drawing near the airport site, which is a bit more than two miles from the dock.

The airfield, free of obstructions to landing aircraft, will accomodate airline aircraft, tourist light planes and twin-engine business executive types.

Business Aircraft Terminal Proposed For Toronto-Malton

Tenders have been called for an addition to the present terminal building at Toronto's Malton Airport. This addition will not interfere with construction of the new multi-million dollar terminal for Toronto which is expected to be started this fall.

Said Transport Minister Hees: "The use to which the present terminal will be put upon completion of the new building, is under consideration by the Department. We may use it as a terminal for executive aircraft or as a depot for air freight. These are future needs at Malton Airports."

The Law Behind the Skyways

by **Howard Newcomb Morse,** *Counsellor at Law. Member of the Bar of the Supreme Court of the USA*

The Case of Wilson vs. C. A. B.

An airline pilot sought review of A. B. orders which:
suspended his airman certificate for ten days, and
denied reconsideration of the suspension.

ie issue posed by the case was ether, in circumstances in which the A. B. does not find the pilot to be qualified to fly, the C. A. B. is emwered under section 609 of the Civil ronautics Act to suspend his airman rtificate as a deterrent sanction.

Under section 609 the C. A. B. "may examine any airman, and, after instigation, and upon notice and hearg, may alter, amend, modify, or susnd . . . (his) airman certificate . . ., the interest of the public so reires. . . ." The pilot argued that, ice reexamination is a condition ecedent to action under section 609. e section must be read to authorize spension only for lack of competence qualifications as an airman. He aintained that disciplinary action for olation of regulations is covered exsively by section 901 of the Civil ronautics Act which provides that a erson who violates (regulations) shall be subject to a civil penalty of not to exceed $1,000 for each such violation." His view was that Congress did not authorize suspension of a certificate for disciplinary purposes.

The United States Court of Appeals for the District of Columbia, in rejecting the contention of the pilot, declared that: "By resting suspension on a Board determination that 'the interest of the public so requires,' Congress conferred broad discretionary authority upon the Board. What Congress had in mind appears from the direction contained in section 601 (b) of the Act that the Act be administered 'in such manner as will best tend to reduce or eliminate the possibility of, or recurrence of, accidents in air transportation. . . .'

"Nothing in the Act or its legislative history persuades us that disciplinary action for violation of regulations was intended to be the exclusive province of section 901. Moreover, the Board has never recognized such exclusivity in its administration of the Act. From the effective date of the Act in 1938 through June 30, 1956, the Board has suspended approximately 4,000 airmen for violation of rules, without findings that they lacked competence or qualifications and without requiring reexamination before reinstatement. This consistent and, until now, unchallenged administrative practice 'will not be overturned except for very cogent reasons.' . . . The most cogent of reasons —air safety—supports the administrative practice here under attack." END

High Conspicuity Paint Undergoing Tropics Test

Because of the tremendous response to the story on high conspicuity paint as a safety aid (A Touch Of Glow, Skyways, December, 1957), Skyways has arranged a cooperative test designed to get the answers to some of the questions raised. Some readers challenged the lasting power of the paint under bright sun and heat conditions of the southern U. S. With the cooperation of Switzer Bros., makers of DAY-GLO, the paint was applied to the control surfaces of a small business plane scheduled for a three-month sojourn in Mexico. The work was done at Mattituck Air Base, Mattituck, N.Y. A complete report will be made on return in June.

Navicom

(*Continued from page 29*)

The Starlighter is manufactured by Don Hoskins, 4980 Marine Drive, Chicago 40, Ill.

Contact-Instrument Primary Flight Training Report

Approximately 90% of the personal aircraft delivered today are equipped with a full complement of navigational, radio and attitude instruments generally associated with instrument flying. However, only a small percentage of pilots operating these aircraft undertake formal training in such flying techniques. As more of these aircraft are being utilized for business purposes, the pressures to initiate flights under marginal or into areas of exposure to possible instrument conditions are becoming greater.

At the University of West Virginia, a project was instituted by The Link Foundation (of New York), designed to investigate the premise that primary flight students could be trained effectively in a course combining contact and instrument flight techniques. It was felt that this would lessen the number of accidents attributed to less-experienced pilots inadvertently exposed to unanticipated instrument conditions and also tend to relieve the anxiety of conscientious pilots on cross-country flights.

The instrument training began concurrently with the first lesson and the syllabus was arranged so that it could be applied by any flight school operator with aircraft equipped for simulated IFR instruction. After completion of this phase, these students were compared with graduates of conventional private pilot courses, as well as examined as to their ability to control an aircraft under IFR conditions.

Further, two students were selected for "post-graduate" instruction of an additional 20 hours of advanced IFR instruction on procedures and radio navigation, for purposes of comparison with applicants for IFR ratings under the existent CAR requirements. All the students had *no* previous flight training and the latter group amassed the grand total of about 65 hours!

Skyways feels that the story of the results of the project techniques can best be told by printing verbatim the report on one of these two "advanced" students, without further comment.

"The applicant was asked to file an IFR flight plan from Morgantown, West Va., to Pittsburgh, Pa., via Mount Pleasant intersection. He filed this by telephone with MGW radio. Just before take-off the following clearance was given the pilot. 'ATC clears N-48D to take off northwest, make left turn; after take-off do not climb above 3,000 until on the SW leg of Morgantown range. Report on SW leg and climb to 3600, cross Morgantown LF range at 3600. Cleared to Mt. Pleasant intersection maintain 3600 to contact Pittsburg radio for further clearance.'

"Flight proceeded to a point seve minutes northeast of Morgantown whe the applicant was asked to contact Mo gantown radio and request a rever course to return to Morgantown ar make an approach. ATC cleared us Morgantown airport for LF range a proach. The approach was execute and when instrument minimums we reached the pilot was asked to execu a missed approach procedure. He pulle up to 4,000 on the SW leg and pil was asked to get a clearance for ar execute a VOR approach. This was a complished. On this approach pilot w given a simulated weather report of thunderstorm southeast of the Morga town VOR. The gyro and horizon we *caged* and unusual positions and stal were given the pilot during procedu turnaround. The rest of the turn w completed on the rate group of instr ments. The pilot completed the a proach."

Performance was as follows:

Phase I. "Instrument flight plannin was excellent. Weather was checke and properly analyzed and flight w well planned. Clearances were copie accurately the first time and followe Estimates were accurate and positio reports were complete and accurat Aircraft performance range and fu were taken into consideration in flig planning and were well understoo

UR BUSINESS PILOTS—have finesse

by Tony Couch

quired instrumentation and equipnt and their proper uses were well derstood by the applicant."

Phase II. "Straight and level flight s above average. The pilot had close itude and directional control and s completely at ease. Turns, climbs, d descents: The aircraft was kept unr close control at all times; turns re accurate. Average. Stalls and neuvering at approach speeds-conl was positive and accurate. Average. eep turns were above average. Reivery from unusual attitudes was made th ease and was prompt, positive and rurate. Above average."

Phase III. "Radio navigation. Radio vigation and orientation. Slightly low average in locating station pasge on LF, otherwise average. Use of dio for voice communication was ove average. All reports were given good phraseology and were comete. Standard instrument approaches re above average. Applicant split the nway on both approaches. Proceres were as published with good alude and speed control. Missed proach procedures were above averge. When told to execute, the pilot lled up immediately and turned to rrect heading."

Emergencies: "Simulated instrument ilfunctions were handled with ease. mpliance with ATC instructions and ocedures. Above average-pilot did ry professional job in ATC work."

General. "This pilot was up to the ndard of an instrument rating. In dition to handling the aircraft well, appeared to have developed suffient instrument judgment to warrant e rating. The above gradings and inions are based on the standards of regular instrument rating test. This lot is an example of what can be done flight training with close control. gh instructor proficiency and good terial."

oposed CAR On Radio andards For IFR Operation

There are no minimum standards of rformance for radio or navigational uipment used in small aircraft opated under Part 42 or for any aircraft erated under Part 43 other than for OR equipment. Maintenance, repair d alteration of this radio communication and navigational equipment may be accomplished by any aircraft mechanic with an airframe rating or any other person working under his supervision.

Aircraft engaged in IFR flight under the provisions for small aircraft in Part 42 and all aircraft engaged in IFR flight under Part 43 utilize the same airways which are used by Part 40 and Part 41 aircraft and large aircraft under Part 42 which do require both equipment and maintenance standards approved by the Administrator. It is essential, therefore, that reasonable insurance exists that all aircraft will be so equipped that the pilot can accurately determine his position in order to permit effective air traffic control. This can be accomplished best by requiring that electronic radio communication and navigational equipment used in these operations be approved by the Administrator, meet uniform standards of performance and be in proper operating order.

The standards for approved electronic equipment used in Part 40 and Part 41 operations and for large aircraft operated under Part 42 are found in the TSO (Technical Standard Orders) of the CAA. These standards were formulated and developed by a special committee of the RTCA (Radio Technical Committee for Aeronautics). RTCA is composed of government and industry representatives including manufacturers, operational agencies, regulating agencies and the military and constitutes a forum of experts in this field. It is proposed that these same TSO be made applicable to all radio equipment used while operating IFR. However, some reduction in the operating temperature requirements for equipment used by small aircraft operating under Part 42 and aircraft operated under Part 43 would be made.

It is the Bureau's opinion that a period of two years from the date of adoption of such an amendment would provide a fair and reasonable period of time for replacement or modification.

Also, from 1952 to the present date, maintenance, repair and alterations of electronic radio communication and navigational equipment have been authorized by persons holding an aircraft mechanic certificate with an airframe rating or persons working under the supervision of such a mechanic. We have been advised by the Administrator that there presently exist in strategic places sufficient numbers of certificated radio repair stations to approve major repairs to this equipment.

In view of advanced designs and the highly technical aspects of present-day electronic radio communication and navigational equipment; instruments, equipment and technical knowledge for proper maintenance and repair are required which are beyond the capabilities of an individual mechanic.

It is the Bureau's opinion, therefore, that all major repairs or alterations of electronic radio communication and navigational equipment required for IFR operations should be accomplished by a certificated radio repair station. The proposed amendment would apply only to installation, major repairs and alterations; other maintenance, repairs or alterations of a minor nature could still be accomplished by a certificated aircraft mechanic with an airframe rating or other person working under his supervision, as provided for in Part 18.

Interested persons may participate in the making of the proposed rules by submitting such written data, views or arguments as they may desire in duplicate to the Civil Aeronautics Board, Attention Bureau of Safety, Washington 25, D. C. To insure consideration by the Board before taking further action on the proposed rules, communications must be received by May 26, 1958.

NARCO Institutes Customer-Dealer Cross-Country Warranty Plan

National Aeronautical Corp., Ambler, Pa., makers of such personal and business aircraft radio equipment as the Sapphire and Omnigator lines, has announced an important change in their equipment warranty plan to relieve one of the major shortcomings in such plans, the need for an owner of radio equipment experiencing a malfunction within the 90-day period, to bring the equipment back to the purchase point for warranty service.

Since most such malfunctions tend to show up during the first 25-50 hours, the revised plan will greatly reduce inconvenience of the customer by providing service under his warranty at the nearest authorized station, similar to other product lines.

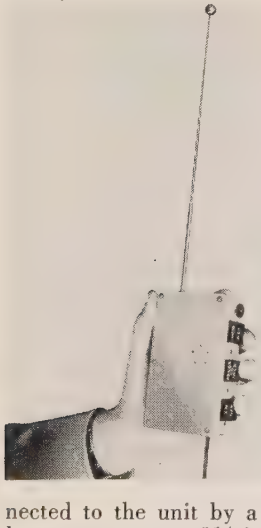
This will provide free bench check and correction of the malfunction at any Narco-designated warranty service station. It does not cover removal and reinstallation. Narco advises that 80 such agencies are now available and they expect to have 150.

New Air-Sea Rescue Radio Beacon Has Transceiver Capabilities

A new miniature radio transceiver designed to provide two-way radio communications between aircraft forced down and search-and-rescue organizations, is produced by Production Research Corp., Thornwood, N.Y.

Besides serving as an emergency radio-telephone link in such instances, or in any instance wherein the plane's normal equipment fails, the model 5735 Transceiver can provide a continuous, tone-modulated carrier on which search operations can home.

Pocket-size, it measures 1⅝-in by 2⅞-in by 5-in and weighs 1¼ lbs. A mercury battery power supply has been designed to provide 15 hours of continuous operation on a 10-minute-receive, 5-minute transmit cycle. Con-



nected to the unit by a 3-ft cable, the battery measures 1½-in by 3¼-in by 7-in and weighs 3 lbs.

In addition to the civilian model operating on the 121.5 mc air-to-ground emergency frequency (convertible to any frequency between 120 and 123 mcs), there is a military model designed to operate on the military distress frequency of 243 mcs.

The manufacturer claims a range of ten miles surface-to-surface and 100 miles air-to-surface possible from the unit's power output of 250 milliwatts.

Completely watertight, the transceiver can be completely immersed without subsequently impairing its operation. The combination microphone-speaker (earphone) is an integral part of the watertight case. The collapsible 12-in antenna is completely within the case when not in use.

(See Air Your Views, page 11)

Circle No. 101 on Reader Service Card

Mid-Alleghanies Area Enroute Control

The highly-industrial complex of middle Pennsylvania and western New York is of considerable importance to business aircraft serving the many industries in this area. Through the introduction of low-altitude enroute control, much delay in ATC handling has been eliminated.

Facilities and frequencies controlling the lower IFR altitudes in this area are:—

Allentown	120.5mc
Binghamton	121.1mc
Elmira	119.1mc
Wilkes-Barre	121.3mc

(Or the navigational VHF frequencies associated, if communications difficulty is experienced in these areas.)

Privately Owned ADF Homers

Despite all advances in VHF navigation systems, new LF area coverage systems, Doppler, etc., the simple fact remains that the ADF will always hold a place in every cockpit. For simplicity and versatility, "bird-dogging" on any radio transmission source within its frequency and distance range with ADF has earned the respect and affection of three generations of pilots.

Because of the above and economy qualities, numerous private organizations such as the airlines have installed their own ADF homers at locations where public funds and traffic do not merit government investment. These facilities are NOT public facilities, hence their use is subject to the courtesy of the operating owners and should be determined before any reliance as other than a VFR or contact navigating aid.

Location	Ident.	Freq. kc	Voice mc
Ada, Okla.	ADH	260	128.3
Alamosa, Col.	ALS	311	128.7
Antonito, Col.	ATN	254	128.7
Athens, Ga.	AHN	287	128.5
Bar Harbor, Me.	BRB	320	130.3
Beatty, Nev.	BTY	299	131.1
Beckley, W. Va.	BKW	266	127.3
Bemidji, Minn.	BJI	375	130.9
Bloomington, Ill.	BMI	414	128.1
Bloomington, Ind.	BMG	260	130.5
Bluefield, W. Va.	BLF	209	127.3
Borger, Texas	BGD	224	128.3
Brainerd, Minn.	BRD	215	130.9
Cape Girardeau, Mo.	HAS	338	128.1
Chama, N. M.	CHX	400	128.7
Champaign, Ill.	CMI	332	128.1
Charlottesville, Va.	CHO	284	127.3
Chico, Calif.	CIC	368	130.7
Clarksville, Tenn.	CKV	382	128.1
Clintonville, Wis.	CLI	323	130.9
Columbus, Miss.	UBS	245	128.5
Cortez, Colo.	CEZ	391	128.7
Crescent City, Cal.	CEC	347	130.7
Danville, Ill.	INV	375	128.1
Death Valley J'tion, Calif.	DVJ	335	131.1
Decatur, Ill.	DEC	400	128.1
Durango, Colo.	DRO	239	128.7
Eau Claire, Wis.	EAU	362	130.9
Farmington, N. M.	FMN	275	128.7
Flagstaff, Ariz.	FLG	368	128.7
Fort Garland, Colo.	FGA	263	128.7
Gadsden, Ala.	GAD	292	128.
Gallup, N. M.	GUP	317	128.
Gary, Ind.	GYY	368	130.
Glendive, Mont.	GDV	410	128.
Green Bay, Wis.	GRB	209	130.
Greenville, Miss.	GLH	296	128.
Greenwood, S. C.	GRD	298	128.
Greybull, Wyo.	GEY	260	128.
Gulfport, Miss.	GPT	236	128.
Guymon, Okla.	GUY	275	128.
Harrison, Ark.	HRO	299	128.
Hattiesburg, Miss.	HBG	212	130.
Hibbing, Minn.	HIB	272	130.
Hickory, N. C.	HKY	332	127.
Int'l. Falls, Minn.	IML	212	130.
Iron M'tn., Mich.	IMT	236	130.
Kronwood, Mich.	IWD	245	130.
Ithaca, N. Y.	ITH	326	129.
Janesville, Wis.	JVL	375	130.
Jefferson City, Mo.	JEF	248	128.
Kalamazoo, Mich.	AZO	233	130.
Kingman, Ariz.	KGM	385	131.
Laurel, Miss.	LUL	410	128.
La Veta, Colo.	LVT	320	128.
Lewiston, Me.	LEW	266	130.
Liberal, Kans.	LBL	400	128.
Lima, O.	LIA	410	130.
Manitowoc, Wis.	MTW	203	130.
Marion, Ill.	MWA	233	128.
Marion, Ind.	MZZ	236	130
Marion, O.	MHN	203	130
Marquette, Mich.	MQT	335	130
Marysville, Cal.	MYV	347	130
Mattoon, Ill.	MTO	347	128
Menominee, Mich.	MNN	272	130
Montrose, Colo.	MTJ	350	128
Moultrie, Ga.	MGR	302	128
Nantucket, Mass.	KCK	224	130
Natchez, Miss.	HEZ	209	128
New Phila., O.	PHD	281	130
Nucla, Colo.	UNC	284	128
Ogdensburg, N. Y.	OGS	203	130
Oshkosh, Wis.	OSH	233	130
Paris, Tex.	PRX	269	128
Pittsburg, Kans.	PTS	365	128
Pittsfield, Mass.	PSF	344	129
Plainview, Tex.	PVW	287	127
Portsmouth, O.	PMH	371	130
Powell, Wyo.	POY	305	128
Redding, Calif.	RDD	215	130
Rhinelander, Wis.	RHI	260	130
Riverton, Wyo.	RIW	335	128
Rockland, Me.	RKD	353	130
Safford, Ariz.	SAD	236	128
Santa Maria, Cal.	SMX	251	130
Santa Rosa, Cal.	STS	284	130
Saranac Lake, N. Y.	SLK	266	130
Sidney, Mont.	SDY	359	128
Silver City, N. M.	SVC	323	128
Snyder, Tex.	SNK	359	127
Spanish Fork, Utah	SFQ	308	128
Stevens Point, Wis.	STE	332	130
Sweetwater, Tex.	SWW	287	127
Temple, Tex.	TPL	248	127
Thief River Falls, Minn.	TVF	281	130
Tupelo, Miss.	TUP	400	128
Vernal, Utah	VEL	206	128
Waterville, Me.	AVI	375	130
Wausau, Wis.	AUW	251	130
West Liberty, Ky.	LIW	275	129
Williston, N. D.	ISN	275	128
Winona, Minn.	ONA	356	130
Wolf Point, Mont.	OLF	404	129
Worland, Wyo.	WRL	209	129

Air Your Views

(*Continued from page 11*)

entlemen:

As a regular reader of Skyways, and so an NBAA member, there are a few mments I would like to make regarding Business Pilot Speaks at ATCA Meet" in e March issue.

Mr. Manning, should be more explicit whom he means by sloppy slobs and nateurs. It is my opinion that pilot and aintenance personnel, as here at Alleheny County Airport at Pittsburgh, are the very highest caliber and any insinuion to the contrary is, without a doubt, ade by the greatest amateur of them all.

mes G. Baird.

ear Sir:

As a subscriber who always reads your agazine from cover to cover, I especially ke the Round Table discussions.

Re: the RT in March on Weather Planng, if all pilots would make up a crossction chart of weather they encounter, en as soon as they land give the Weather ureau meteorologist the chart, the service ould be much improved.

I would like to see an RT on Co-pilots Business Aviation. Our company oper- es two twins. The pilots do all the flying d the co-pilots only when there are no assengers on board or under VFR, and en only from the right side. We all have ulti- and single-engine, IFR and A&E tings, but we are used almost exclusively A&E's. We were charter pilots, instrucrs and free-lances, but how can we keep roficient averaging 50 hours a year in the ght seat? Isn't this a safety hazard?

Could this problem be discussed by chief lots, aviation division managers and men ose to proficiency training?

(Name withheld by request)

New Seating Principle

(*Continued from page 27*)

The seat and frame are of hydroormed aluminum alloys of light weight nd high weight-strength factors. The ushions are made of a combination of olyether foams. Lighter than conventional seats generally in use, they can e installed in practically all business ircraft in the medium to heavy twin ange. According to PacAero, who is etting up a plan of nationwide distribuon of the seats, they are priced about ie same as most seats now in use.

For those of us who often fly to our ork—and work or sleep while we fly—is new seat may be a big help. If the ontour principle is all that the medical esearch team and the manufacturer laim, it is probable that other seat akers will soon follow suit.

Circle No. 16 on Reader Service Card

Greenhouse Patter

(*Continued from page 12*)

unction with the same degree of effiiency at night. My mental clocks are et on Eastern Standard Time at the oment, and when we fly to California cannot fool my body into an immediate transition to PST although I have ried. So, if we fly off into the dark blue at 11 pm PST, it's still two o'clock in the ayem, and three hours later it's five o'clock, and at five dingie dongies in the morning I am in the hay, not up on Victor Airways looking at ice on my wings through an oxygen mask.

Suite 344

(*Continued from page 6*)

Flight Test, Seattle Div., E. C. Wells, V-P. Eng. (Seattle), in charge of aviation activities; LOCKHEED AIRCRAFT CORP., Georgia Div., Marietta, aircraft mfgr., operating Lockheed 18, R. I. Mitchell, Sales Mgr., is NBAA Rep. and L. W. Harris, Chief Pilot; SKYWAYS PUBLISHING CORP., New York, N. Y., publisher of SKYWAYS FOR BUSINESS, G. Lois Henry, Pres., is NBAA Rep.; THE KLINE MFG. CO., Galena, O., mfgrs. aircraft hydraulics, operating Beech D-18, W. L. Kline, Pres., is NBAA Rep. and Chief Pilot; GREENSBORO-HIGH POINT AIR SERVICE, INC., Greensboro, N. C., general aviation—Beech distributors, operating Beech Travelair 95, Beech J-35 Bonanza, Piper Apache and Piper Tripacer, K. V. Brush, Jr., V-P is NBAA Rep.; ATLANTIC AVIATION CORP., Wilmington, Del., aircraft sales and service, Stewart M. Ayton, V-P, is NBAA Rep. and Frank R. Guididas, Chief Pilot, operating Beech Bonanzas, Twin Bonanzas, Travelairs, D-18S, E18S and Piper PA-23 Apache. (Associate Members)

(NOTE TO THE BOSSES)—Did you remember to give your secretary a vacation on National Secretaries Day (April 23)?

Come in to see us at National Headquarters. C. M. CEARNAL

Business Flying Center

(*Continued from page 40*)

program is completed sometime in 1958, it will represent the largest and most elaborate privately-financed business flying facility in the world.

What accounts for the phenomenal growth of this company through 26 turbulent years which saw so many aviation businesses rise and fall? The company was founded by men who knew how to run a strong business organization, with a keen eye for the needs of the growing aviation picture and a sense of integrity that built a reputation for workmanship and service. The company, having faced the challenge of today's tremendous growth in business flying, is already looking forward to the time when present-planned facilities may be saturated.

Accident Report

Standard Oil of Ohio Lodestar Crash Near Uniontown, Pa.

On Oct. 6, 1957, Lockheed Lodestar, N 80G, owned and operated by the Standard Oil Co. of Ohio, Inc., crashed into the side of a mountain near Uniontown, Pa. The six occupants were killed and the aircraft was demolished. CAB report was adopted March 13, 1958.

History of the Flight

N 80G departed Cleveland, O., at approximately 1208 EST, for Ingals Airport, Hot Springs, Va. Crew consisted of captain and copilot. Purpose of the flight was to pick up passengers at Hot Springs, fly to Johnstown, Pa., for an additional passenger and return to Cleveland. The flight landed at Ingals Airport without incident.

N 80G departed Hot Springs at approximately 1545 with four passengers. About 1650, over an hour after takeoff and just before the aircraft struck the mountain, it was heard by a number of persons who lived within a radius of 10 miles of the accident scene; none saw it.

Investigation

Site of the accident was a heavily wooded mountainside 4-½ miles ESE of Uniontown, Pa. Elevation of the accident site was 2,338 feet, 162 feet below the top of a 2,500-foot mountain. Investigation revealed that the aircraft struck the east side of a 20-degree mountainslope on a heading of 65 degree magnetic while flying nearly parallel to the mountain ridge. The aircraft, in level attitude, first struck the top of a small tree approximately 35 feet above the ground, and then cut a swath approximately 510 feet long and 80 feet wide through the trees. All components of the aircraft were accounted for within the wreckage area with the exception of the right engine which was found approximately 100 feet down the hill. Fire, which followed impact, destroyed the cabin and the cockpit. The aircraft was equipped with full instrumentation for instrument flight but the instruments were damaged beyond readability.

Evidence of the force with which the aircraft struck the trees was manifested by a valve from the top of a CO_2 bottle imbedded three inches in an oak tree approximately five feet above the ground, and a turnbuckle imbedded 2-½ inches in a tree approximately 10 feet above the ground. Both engines had suffered considerable impact damage, but examination revealed no evidence that either had malfunctioned or failed prior to impact.

The dome positions of both propellers corresponded to blade angles of approximately 30 degrees. This blade angle, 9 degrees above the low pitch stop setting, indicates that both engines were developing power at impact.

It was determined that fire did not occur while the aircraft was in flight.

Many witnesses were contacted who heard but did not see the aircraft. All were in accord that the aircraft was flying low. Some said that as it passed over their houses windows and furniture shook. All agreed that the engines of the aircraft sounded normal and that the aircraft seemed to be flying northeast. They reported the visibility to be very poor owing to fog and rain. Several persons who went to the scene shortly after the accident stated that the fog became much thicker as they approached the wreckage, making road traffic hazardous.

No fuel or other service was furnished N 80G during the time it was at Hot Springs. While the crew waited for their passengers they lolled about the waiting room and read magazines. Manager said he was away from the office for approximately 15 or 20 minutes while servicing another aircraft; during the time he was in the office and for a full half-hour before the aircraft departed, he did not hear either pilot call a CAA communications station to check weather or file a flight plan. He did hear the captain make a telephone call, using a company credit card, to the residence of the passenger to be picked up at Johnstown. After this the manager said the captain went to his aircraft and prepared to depart. The manager said further that at the time of the aircraft's departure the cloud ceiling was 700 to 800 feet broken to overcast above the airport; he was unable to observe any evidence of a higher cloud layer through the breaks in the clouds. The visibility was 5 to 15 miles; the temperature 45 degrees F.; wind west, variable west to northwest, 12 mph. To the north it was very dark and weather in that direction appeared to be worsening because of lowering ceiling and rain showers.

Evidence indicates that the aircraft weighed about 1,000 pounds under the allowable gross takeoff weight.

U. S. Weather Bureau at Cleveland Airport was contacted to determine if either pilot of N 80G had been briefed by Weather Bureau personnel. No record of these weather briefings is kept; however, one forecaster on duty that morning did remember briefing a pilot who was flying to Hot Springs.

Weather Bureau area forecasts issued by Cleveland and Washington pertinent to the routes presumed to be flown indicated that below VFR conditions were expected throughout portions of the return flight.

The pilots of N 80G did not file a flight plan before departing Cleveland nor was a flight plan filed by telephone while at Hot Springs or at any time throughout the flight. There is no record of any radio contact between N 80G and any CAA communications stations during this flight.

The captain had flown for this company for several years as copilot and relief pilot. His employment record indicates that he left the company in October 1950 to fly for another company as captain of its Lockheed Lodestar, and was re-employed by SOHIO as captain in June 1957. He was 40 years of age and had approximately 10,000 flying hours, of which 3,000 or more were on Lockheed-type aircraft. He had an excellent reputation and was considered an above average instrument pilot, having taught instrument flying in the Cleveland area for a number of years.

Analysis

The Board believes that either the captain or his copilot was briefed by the U. S. Weather Bureau prior to departing Cleveland. Forecasts available to the crew at time of departure from Cleveland indicated a return trip VFR might be possible although weather would be marginal for VFR flight, particularly in southwestern Pennsylvania. Later forecasts definitely indicated this portion of the flight should be made IFR. These latter forecasts would have been available if requested. Although this may be why the captain attempted to fly VFR to Johnstown it in no way excuses him for not taking necessary precautionary measures expected of a trained pilot, namely, the checking of existing and forecast weather at a turnaround point when a stop of approximately two hours is involved.

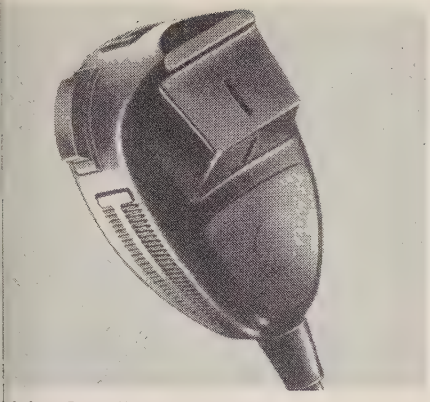
The distance from Hot Springs to the scene of the accident is 135 miles. Direction is almost due north. Investigation revealed that N 80G flew approximately 70 minutes before striking the mountain. This elapsed time is considered long for an aircraft that averages approximately 198 knots TAS at an average altitude of 5,000 feet during cruise. The aircraft should have flown the distance in 39 minutes. It is concluded that a direct course was not flown.

The aeronautical chart shows the direct course to Morgantown-Johnstown would be flown over mountainous terrain. Along and adjacent to this course are mountains rising to an elevation of nearly 4,900 feet. However, a course northwest from Hot Springs would be flown over only 48 miles of these mountains before reaching much lower terrain.

It is believed probable that the captain first having decided to fly to Johnstown VFR, took off from Hot Springs and flew northwest; that he probably continued in this general direction until well clear of the mountains and then turned north. This latter direction would then have been maintained until the aircraft was near Morgantown where a change to a northeasterly heading, toward Johnstown, would have been made.

This general flight path is considered most likely because: The weather north and east of Hot Springs was unfavorable, while to the west were somewhat higher cloud ceilings and lower terrain. Another factor is that a short time before departing Hot Springs the pilot had flown in from the northwest and knew what the weather was in that area. Such a course of action is understandable; what is not understandable

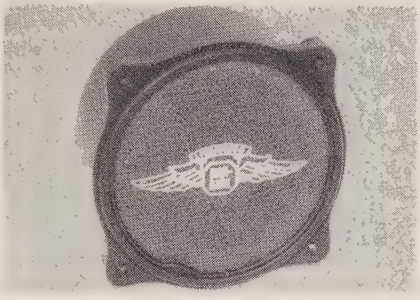
(Continued on page 58)



Noise Cancelling Microphone

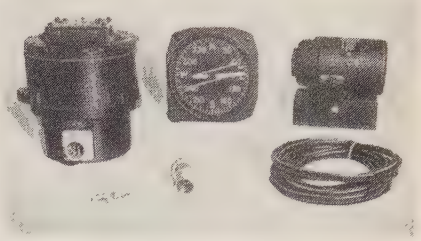
ractor For Ground Handling

Dry Chemical Extinguisher

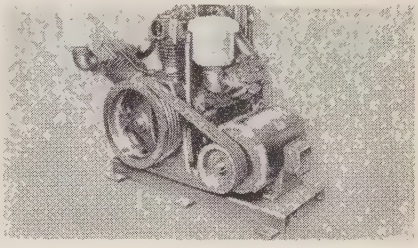


Panel Mounted Speaker

VOR-ILS Half Loop Antenna



Remote Indicating Compass Kit



Stationary Air Compressor

nu-avi-quip

oise Cancelling Microphone

Aircraft Components, Inc., Benton Harbor, Mich., announces a new aircraft microphone specially designed for se under the high ambient noise conditions usually found in aircraft. The pecial noise cancelling design which roduces maximum intelligibility is aterproof, shockproof and comes complete with mounting bracket and 5 ft of oiled cord.

Circle No. 53 on Reader Service Card

ractor Makes Ground Handling Easy

Moving single and twin engine aircraft is one man operation with the ero Tractor produced by Aero Vector orp. The hand operated tractor is daptable to any tricycle landing gear ype aircraft.

The tractor lifts the plane's front heel by means of an hydraulic jack, owering the tail so that it clears overead obstructions. It features speeds to mph in forward and reverse and a rake which allows unattended parking n an incline.

Circle No. 54 on Reader Service Card

ry Chemical Extinguisher

Fyr-Fyter Co. offers a 2½ lb size dry hemical fire extingusher for use in usiness aircraft. Known as the Model 3-1, the portable extinguisher can be sed against both flammable liquid and electrical fires, gas, oil, paint, etc.

Operating at 150 psi with pressure constantly indicated on a built-in gauge, this lightweight extinguisher incorporates a new rubber valve assembly which is said to be both leakproof and foolproof. Manufacturer claims the unit is easily recharged. Mounting bracket is included with the extingusher.

Circle No. 55 on Reader Service Card

Panel Mounted Speaker

Livingston Electronic Corp. has produced a panel-mounted cabin speaker which is built into a standard instrument case enclosure to provide minimum installation problems. The low cost unit is entirely transistorized.

Circle No. 56 on Reader Service Card

New VOR-ILS Half Loop Antenna

A VOR-ILS Half Loop Antenna Type DM N4-2 is announced by Dorne & Margolin, Inc. The antenna is an electrically balanced loop. When installed on the vertical tail or sides of an aircraft fuselage it provides substantially omnidirectional sensitivity to horizontally polarized radiation in the band of 108 to 122 mc.

The antenna provides considerably more gain at the horizon than a fuselage-mounted "deer horn" or "V" type assuring more accurate bearing information. Antenna radiates very little energy along the axis of the loops and tends to reduce rotor modulation in helicopter installation. This type of antenna is capable of withstanding severe ice loads and weighs approximately 2 lbs, 3 oz.

Circle No. 57 on Reader Service Card

Remote Indicating Compass Kit

Personal business aircraft owners are offered a remote indicating compass kit produced by Aircraft Components, Inc., Benton Harbor, Mich.

Kit is claimed to offer freedom from deviation errors, increased stability, freedom from drift and ease of reading the vertical type dial. The knob-controlled pointer aids in aligning aircraft with a desired heading.

Circle No. 58 on Reader Service Card

Stationary Air Compressor

An "all new" stationary air compressor, a 25 hp model, is announced by Le Roi Div., Westinghouse Air Brake Co.

The small, compact unit is rated for continuous duty at 175 psi. It is designed to fill the needs for a high volume, high pressure air compressor. It is also available at 125 psi.

Model 25S2 is two-stage, air-cooled, electric motor driven, for applications where compactness, light weight and minimum operator attention are required.

Circle No. 59 on Reader Service Card

Accident Report

(*Continued from page 56*)

is why the pilot elected to fly toward and into lowering ceilings without obtaining an IFR clearance. It must have been obvious to the pilot as the flight progressed that the weather was deteriorating in the direction of Morgantown. Why a pilot of his capabilities as an instrument pilot would deliberately fly into such weather conditions at an altitude insufficient to clear the terrain and without the proper clearance is unexplainable.

Probable Cause

The Board determines the probable cause of this accident was action of the pilot attempting VFR flight under instrument conditions over mountainous terrain.

Accident Report

Capital Airlines Douglas C-47A Near Clarksburg, Maryland

The following CAB accident investigation report was recently adopted. It is summarized here for the benefit of the pilots of the many corporate operated DC-3s.

The Accident

A Capital Airlines training flight crashed near Clarksburg, Md., about 0750 EST on June 22, 1957. The instructor and two pilot trainees, the only occupants, were killed in the crash.

History of the Flight

This was the second of a series of six flights being made for the purpose of giving flight instruction to prepare for upgrading from copilot to captain.

The flight was dispatched in accord with visual flight rules. The aircraft was fully serviced with 820 gallons of fuel. Its gross takeoff weight was less than the maximum allowable and the center of gravity was within allowable limits.

At approximately 0745, N 88835 was observed in the vicinity of Clarksburg, Md., by many people who saw it during several minutes of flight and in its plunge to the ground.

Investigation

In its final descent, N 88835 passed almost straight down through a group of trees, landing on top of an automobile. A complete and exhaustive study of the entire wreckage was made. There was no evidence found of fatigue cracking, aircraft deformation or structural failure prior to impact.

Nothing was found in the control surfaces or control systems to indicate inflight malfunction of any kind. Detailed examination of the remaining portions of the aircraft revealed no indications of failure or malfunction prior to impact. All observed damage to fuel, oil and hydraulic lines was the result of the crash. Destruction of the cockpit area and fuselage was so complete that no significant findings could be obtained. However, there were no indications of structural fatigue or inflight failure which might have resulted in loss of or difficulty of control.

Both powerplants were meticulously examined for possible malfunction. The engines, although heavily damaged by impact, showed no signs of operational difficulty. An examination of aircraft and powerplant records disclosed that scheduled inspections and maintenance had been properly and satisfactorily completed. Pilot flight log writeups had been corrected and there were no carryover maintenance items.

The copilots were being given flight training for their ATR examination. This training is conducted under a program set up by the flight training department of Capital and includes ground school and flying training. Flight training consists of a minimum of six two-hour periods. In each period the trainee flies the airplane through a standard set of maneuvers designed to acquaint him fully with the flying characteristics of the airplane at various speeds and attitudes and in various configurations.

Aircraft spins are prohibited and consequently are not demonstrated. They are, however, discussed and spin characteristics are described by the instructor in ground school training.

Both copilots had several thousand flying hours in DC-3 aircraft and had flown as copilots with Capital for several years. The captain was very experienced and, although an instructor for only a short time was considered extremely competent.

Company witnesses described the flight training curriculum in detail. The maneuvers taught are arranged in a fairly rigid sequence so as to give the pilot the most benefit from each training period. These witnesses thought they could estimate what maneuver his pupil would be executing at a given time after takeoff. All thought it probable, because the flight had been airborne approximately 1¼ to 1½ hours, that it would have progressed through the sequence of maneuvers to the "canyon approach."

The "canyon approach" simulates letting down to an airport surrounded by obstructions, followed by an emergency pull-up, and it combines most of the airwork taught each student. Proper execution requires exact control of airspeed, altitude, headings, power settings and cockpit procedures, all of which must be accomplished under the "hood."

The Capital flight instruction manual states:

"RECTANGULAR PATTERN AND CANYON APPROACH.

"a. Stress accuracy of heading and timing of legs and turns (vary pattern to emphasize necessity of listening closely to instructor).

"b. Stress smoothness and proper commands in proper order during abandoned approach.

"c. If engine/s is cut importance of controlling aircraft during emergency."

Specifically, for the "canyon approach" the student simulates an approach making a rectangular pattern. He then performs an "in range" cockpit check and lowers one-half flaps. When airspeed slows to 95 knots he calls for extension of gear and full flaps. With power off, he descends 1,000 feet holding 95 knots. At 200 feet above the simulated airport elevation (generally selected as 3,000 feet m. s. l.), he levels off, applies full power, orders gear and flaps "up" and begins a maximum performance climb at 85 knots. At this point the instructor may, in his discretion, "cut" an engine. If an engine is "cut" the student must complete the emergency procedure and continue climbing at 85 knots for 300 feet. He then increases speed to 95 knots and makes a 180-degree standard rate turn.

In this instance the aircraft was observed by numerous people. Their descriptions of its flight coincide closely with the first portion of the "canyon approach," and lend substantial corroboration to the belief that the accident occurred during the execution of that maneuver.

It appeared to be flying slowly and descending slightly with its engines backfiring at an altitude variously estimated as from 1,500 to 3,000 feet. It flew in a straight line for about two miles. When considerable power was applied the airplane apparently gained some altitude in a climbing turn to the right. Almost immediately the aircraft rolled slightly to its left while losing some altitude. It then rolled over the top and entered a spin to the right.

Spin characteristics of the DC-3 (C-47) have been described in several NACA reports. There are also available several reports from pilots who have spun the DC-3 both intentionally and unintentionally. These reports show that in the unintentional or inadvertent spin considerably more altitude is lost than in an intentional spin before recovery can be effected. Presumably this is due to the element of surprise. Altitude loss, as much as 3,000 feet has been reported by experienced pilots, in an inadvertent spin of only one turn.

Tests show that altitude loss per turn in a steady spin is about 600 feet. Further, that after the rudder is reversed rotation will stop in approximately one turn and that the loss of altitude for this final turn will be approximately 1,000 feet. When rotation is stopped the aircraft will be vertical. It will then require an additional 2,000-2,500 feet of altitude to return to level flight.

In the instant case, spin rotation had stopped before the aircraft struck the ground in a near vertical attitude. Most witnesses said they saw several turns in the spin. Using the data above, it is evident that the aircraft entered the spin from an altitude of at least 2,500 feet above the ground. This determination, significantly, is in agreement with the altitudes of the aircraft as estimated by eyewitnesses. It is also significant that this altitude is approximately the altitude at which the aircraft would

(*Continued on page 62*)

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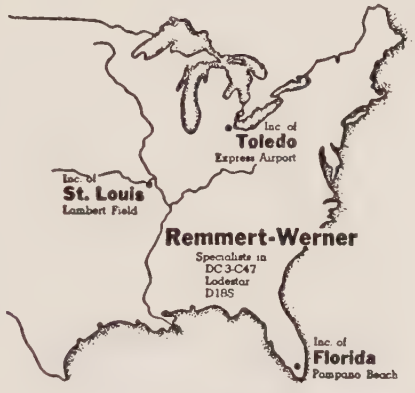

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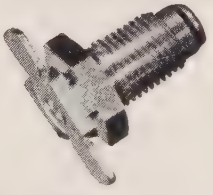

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Accident Report

(*Continued from page 58*)

normally be expected to be during the abandon-approach phase of the "canyon approach." It will be remembered that Capital personnel stated that the usual procedure was to use 3,000 feet above sea level as the simulated elevation for the "canyon approach." Therefore, because the average elevation of the terrain in the vicinity of Clarksburg is 500 feet above sea level, the aircraft would be approximately 2,500 feet above the ground.

From all this data, together with a preponderance of the evidence from eyewitnesses, it is determined that the aircraft spun from an altitude too low to permit complete recovery, and that although rotation had stopped considerably more altitude would have been necessary to allow the pilot to regain straight and level flight.

Accident Report

Takeoff Crash Laid To Check List Omission

(CAB Report Abridged)

On July 10, 1957, a Lockheed Lodestar, owned by the C. R. Vose Co., crashed and burned during takeoff at the King Salmon, Alaska, Airport. All occupants, two crew members and four passengers were killed.

The flight crew of N45378 was Pilot Edward Coligny and Mechanic-Flight Engineer Ralph L. Hughes. A VFR flight plan was filed to Anchorage which proposed a flight duration of 1:40 at a cruising speed of 170 knots, fuel on board—6:30.

Following a ten minute period of engine run-up on the ramp, the flight was cleared directly to and on runway 11 where several persons saw it pause one to two minutes and heard props run through one or two times.

The takeoff seemed entirely normal as the airplane left the runway surface and climbed to between 75 and 100 feet. The landing gear, however, remained extended. The climb continued normally although somewhat steeper to between 150 and 200 feet, at which time it steepened rapidly but smoothly until it was nearly vertical. At the peak of the climb the aircraft pivoted counetrclockwise, plunged to the ground, and exploded. An intense fuel-fed fire ensued.

Weather conditions at the time were clear and visibility 60 miles.

Investigation by the Board revealed that the Vose party landed at King Salmon on July 7 after a flight from Nome. Until July 10, N45378 remained parked on the ramp.

On July 9, in accordance with instructions of the crew, 220 gallons of fuel were added to that already aboard. (A refueling slip indicated complete fuel service at Nome.) The attendant at King Salmon stated that because 91/98 octane was the highest available there, the crew instructed him to place it only in the rear and auxiliary tanks. The front tanks were not opened and the amount of fuel in them is unknown.

Flight reports and maintenance log sheets recovered showed that no discrepancies of significance had been experienced during the Alaskan trip. Witnesses to the loading noted that baggage, estimated to weigh about 550 lbs, was distributed and placed in approximately equal amounts in the front and rear baggage compartments.

The four witnesses to the takeoff, located at three different places on the airport, included two experienced pilots and the tower controller. All were in substantial agreement as to the events which occurred.

The takeoff roll was begun with a smooth unfaltering application of power. The ground roll was straight and the plane became airborne after about 2000 feet. The transition from ground to air seemed entirely normal and there was no noticeable yaw, pitch or roll. The aircraft assumed a normal climb to between 75-100 ft, then somewhat steeper to about 150-200 ft. At this point, as airspeed increased the climb steepened rapidly but smoothly until the aircraft was in a near vertical nose-up attitude. Still there was no noticeable roll or yaw and the path of the aircraft remained approximately over the runway. The witness located directly behind the aircraft stated that at the peak of the climb, estimated at 500-700 feet, he could read the identification number painted on the upper surface of the wing. The Lodestar then nosed forward slightly and hung momentarily in a steep nose-up attitude with its wing rocking. Immediately thereafter the aircraft pivoted counterclockwise reversing its heading, assumed a vertical nose-down attitude, and plunged to the ground.

Almost all persons stated that the engine sound indicated continuous development of high power throughout the flight.

Because of the unusual ascent after takeoff, great attention was devoted to the examination of the control system and in particular the elevator and elevator trim tab controls. All control cables to the empennage were properly attached at both the cockpit and tail ends. There was no evidence to indicate jamming or interference of the elevator, rudder or trim control systems.

The cockpit control settings were also examined carefully. Although all other trim tab controls were positioned normally for takeoff, the elevator trim tab indicator was found indicating a setting of 17½ units *nose-down*. This setting was abnormal for any flight configuration of the aircraft, especially for takeoff which was normally at or near zero, depending on the gross load.

The elevator trim tab control setting as shown by the indicator was pursued by examination of the trim tab control assemblies recovered from the wreckage. Disassembly and study of their mechanical operation showed the elevator trim tab was positioned for an extreme nose-down condition. Thus, this examination further revealed the cockpit indicator corresponded closel to the trim tab position.

Because the elevator trim tab i connected directly to the shaft screw which extends or retracts as the con trol cable rotates the tab control drum the position is not susceptible to dis placement by impact.

Cockpit positioning of the elevato trim tab setting is accomplished by crank-type control located on the ped estal just below the throttles when se in the idle position. An arrow move with the cranking action pointing t the trim tab setting, which is displaye as units of nose-up or nose-down ad justment. The range of adjustment i from 25 units nose-up to 25 units nose down.

The latest CAA Form ACA-337 liste the gross weight allowable at takeof as 18,500 lbs. Review with regard t work performed on the aircraft, and i light of Aircraft Spec. No. A-723 showed that N 45378 qualified for higher gross weight of 19,500 lbs, in cluding being equipped with 1820-7 engines. Nevertheless, application, in spection of the aircraft, and certain re quirements concerning aircraft manual for the increased gross weight as re quired by CAR SR-407 had not bee complied with.

Investigation of the loading condi tion at the time of the accident o necessity required an approximation e the amount of fuel in the front tank and the weight of baggage. Assumin a minimum of 550 lbs baggage and tha the front tanks were at least one-fourt full, together with other accepte weights from the latest weight and ba ance data, it was evident that approx mate gross take off weight was 19,50 lbs, or about 1,000 lbs overload. Th load, was however, properly distribute with respect to the center of gravi limitations of the aircraft.

The possibility of a sudden weig shift was actively considered. Ther were no large single items aboard t cause a shift of weight, and all occu pants were in seats with safety bel fastened at the time of impact.

A triangular, wedge-type externa elevator-rudder control lock was foun at the perimeter of the fire area. It wa learned that this was merely surplu equipment and no longer used as gust lock on the aircraft. The Voss C chief pilot stated that the Lear rudde system was on the aircraft and a ne locking system also installed. The d sign of the system held the yoke rea ward and would make it virtually im possible for the pilot to take his se with the locking system engaged. I vestigation showed that this locking d vice was not in place in the cockp after the crash and there was no ind cation it was in place prior to the im pact.

Statements were obtained from e perienced Lodestar pilots concernin the yoke forces which could be pr duced by various settings of the el vator trim tab controls. These were the effect that the trim tab forces a very powerful and that certain i proper trim tab settings would produ

rces which the crew may not have en able to overcome if they were rprised and did not take prompt corctive action. In two instances, pilots flecting personal experiences stated at they had taken off with the eletor trim tab inadvertently left posioned for a full flap landing. They ated that shortly after becoming airrne they experienced a very powerful arward pressure on the yoke. This curred rapidly enough that an eleent of surprise was introduced. Except r an immediate change of trim, they lieved the force would have been too werful to overcome. One plane ached a steep nose-up attitude and though corrective action was prompt e aircraft nearly stalled.

At least two Lodestar accidents relted from improperly positioned eletor trim tabs during takeoff accordg to the Board. In both instances, itness' descriptions of the flight paths ere nearly identical to that of N45378.

Records on the pilot indicated that had accumulated more than 10,000 urs, with about 1,000 in PV-1 and destar aircraft. The chief pilot flew ith Mr. Coligny for approximately 100 urs, and described him as an accomished and conservative pilot. In reonse to questions, he stated that the rcraft was equipped with a prekeoff checklist and that from his obrvations, it was Mr. Coligny's habit use it.

NALYSIS

At takeoff, N45378 was loaded to an timated weight of 19,500 lbs., 1,000 s over the authorized weight. Since e aircraft was qualified for the higher eight and the load was properly disibuted, it is obvious the additional eight was not a factor in this accident.

Numerous possibilities such as load ifts, control malfunction, and locked ntrols were exhaustively pursued and iminated, The very nature of the flight ath, straight without roll or yaw, and hich reached an approximate height 500 to 700 feet in less than 4000 feet forward movement, clearly eliminates e possibility of malfunction or failure either or both powerplants.

An analysis of fuel consumption from ome to King Salmon, based on the mount of fuel added to the rear and ixiliary tanks at King Salmon, reals considerable amounts were burned om each of these tanks enroute. The nsiderable nose-up trim required durg a normal landing would be inreased by this apparent fuel schedulg. From an operational consideration is therefore believed that the trim osition during landing at King Salon, if not changed for takeoff, and if oupled with surprise and delayed corctive action, would produce a nose-up rce that can't be overcome manually.

The possibility of an improperly posioned nose-up trim condition is also iggested by the setting found after the rash, 17½ units nose-down. The setng does not relate to any normal flight nfiguration of the aircraft. The flight ath as described could not have ocurred had this nose-down setting xisted during the takeoff. Not the result of impact, it is very probably the result of a desperate effort of the crew to relieve the yoke pressure without regard to obtaining a specific setting.

Both the flight paths of other aircraft which crashed because of this condition and of aircraft which nearly crashed as a result of this condition, are distinctly similar to the early part of the flight of N45378.

After careful consideration and analysis of the available evidence, it is the belief of the Board that this accident was the result of taking off with the elevator trim tab positioned for landing.

End

Weather Wonderland

(*Continued from page 19*)

Part Time Service

One out of five of the Weather Bureau airport stations is now operated on a part time basis, often only eight hours per day. The Weather goes on unobserved and unreported the remaining hours. In fact, more than 50 Weather Bureau airport stations operate less than 24-hours daily, despite requests for continuous service. Where this does not meet the observational requirement for normal air carrier operations outside assistance is requested from CAA, the airlines, or airport organizations—not always successfully. St. Joseph, Mo., is an excellent example of a station located on one of our busiest airways, where for lack of money to provide the necessary manpower the station is operated on a 16-hour per day basis.

The overall number of forecasters available for writing forecasts, for advising CAA on weather conditions affecting traffic control procedures and for the issuance of warnings is down more than 20% from the staff of ten years ago. The greatly increased aviation need over this period, coupled with the sharp reduction in staff has resulted in far less time being available for the preparations of forecasts. Under such circumstances there has been a natural decline in the quality of forecasts and in service to aviation generally.

Technical Advances

To bridge the growing gap between services demanded and staff available, several technological advances have been utilized to increase the capacity of a station to serve. These include: Installation of facsimile to offset local plotting of weather maps, use of recorded weather information over automatic telephone devices, the establishment of a Severe Local Storm Warning Service, establishment of a weather radar reporting network, end of the runway observing equipment and the development of an automatic weather reporting station to transmit observations directly on the national aviation weather teletypewriter service. The Weather Bureau also furnishes recorded aviation briefing information to groups which sponsor the cost of the telephone service.

Mass Dissemination

To combat the growing inability to brief pilots, the Weather Bureau, in a joint effort with the CAA, experimented in 1954 using the Arcola, Va., L/MF radio range to service the Washington area with continuous aviation weather broadcasting using a recorder repeater device. The experiment was so successful that a plan was worked out in 1956 to provide similar service on a national basis over the 88 L/MF ranges designated to continue in operation as the General Service Radio Ranges. For example, daily transcribed broadcasts over one L/MF radio range in the Dallas-Ft. Worth area would provide basic service to *86* outlying airports which presently have no weather service. However, the Weather Bureau has been stymied in further exploiting this immediately available means of mass dissemination because of budget restrictions.

What's Needed

Listed below is an estimate of what steps are needed to put the Weather Bureau in a position to service aviation adequately today.

- Bring 200 Weather Bureau aviation airport stations up to required staffing standards.
- Restore 24-hour day service at 50 airport Weather Bureau offices which now operate on a part time basis.
- Set up a continuous nation-wide aviation weather broadcasting and warning service using the 88 L/MF ranges.
- Establish new aviation weather observing and briefing offices at high priority major airport locations. Examples are: White Plains, N.Y.; Santa Monica, Calif.; Reading, Pa.; Mid-Continent Airport, Kansas City, Mo.; O'Hare Airport, Chicago, Ill.
- Provide weather chart facsimile service at 100 additional airport weather offices.
- Install modern communication

equipment (telephone, teletype, closed circuit TV and other devices) where needed for better weather briefing.

- Increase research and engineering studies to provide for more accurate forecasts and to prepare for eminent jet operations.

Your Move

Your safety of flight is involved in all of the above recommendations.

The Weather Bureau has proved that it can do the job if provided with the necessary staff and hardware.

The time is now to protest poor aviation weather service to those who can affect changes—your Congressmen. They are interested in receiving specific recommendations from their own areas on what is needed to bring aviation service up to an acceptable standard. A copy of these recommendations should be sent also to the Senate and House Appropriations Committee

Government Competing With Fixed Base Operations

At a time when anyone and everyone seems to have a pet cure for the current economic recession, we find an astonishing paradox in an example where official government policy is aiding in deepening the business recession in at least one phase of the aviation industry.

A reversal of this policy would stimulate private enterprise with a corollary economy in government expenditure rather than just the opposite as in so many "spark the economy" plans. We quote from the 1958 Congressional Record, Representative H. R. Sheppard (Dem. Calif.) speaking: "Mr. Speaker, I wish at this time to bring to the attention of my colleagues in Congress a growing situation which I view with alarm. This has to do with a rapidly deteriorating professional aircraft maintenance and overhaul industry in face of the greatest workloads since World War II.

"This situation is due largely to the constantly increasing Government workshops which have grown to the point of employing over 140,000 technicians while private enterprise is laying off thousands of highly skilled personnel which can accomplish this work at considerably less cost than the Government workshops.

"It has been and still is our first duty in Congress to provide the new weaponry that our military needs to defend our Nation. But while our main attention has been on these complicated problems I am afraid the military has run off with the ball in another direction—that is setting up a large business in our Nation in competition with private enterprise. Such a policy is contrary to intent of Congress and certainly the often pronounced policy of the administration of getting Government out of business.

"Unfortunately, when appropriation requests come before us for this important phase of our military activities I find the figures are widely scattered and buried within operations to the extent that it has been difficult to ferret out what is actually going on.

"My information indicates that of the $1.5 billion which we approve for the Navy and Air Force for aircraft maintenance, overhaul and modification, only approximately 3% goes out to competitive bid which is the only measuring stick we have of knowing if the cost is right. Over 36%, or $565 million, is retained by the military to operate their own shops while industry, which has not one Government dollar of the total $100 million investment in plant facilities, is now operating at only 50% capacity.

"The whole subject of maintenance is now taking a $7 billion bite out of our military budget and as we stockpile more hardware it will be even greater. This brings me to the point of urging Congress to investigate this situation, set up or suggest a policy to be followed, and require corrective action. This subject is important to our economy as well as reducing costs to the taxpayer and maintaining proper procurement policies within our Defense Establishment.

"Just last week Congress approved a multi-million-dollar supplemental appropriation to provide dispersal facilities for SAC. It is proper that SAC be dispersed but before we plow millions more into new facilities, I urge this House to take a look and find out why we cannot turn into SAC bases our present huge investment in the extensive 'workshop' airports which are ready made for dispersal now. This would free those present technicians which SAC says it must have because they are unable to get more than 12% of their fleet in the air at one time without these technicians. This industrial type of aircraft maintenance running into many hundreds of millions of dollars could then be turned over to private enterprise at a great saving in cost and badly needed first-line defense technicians. The way it is now the amount of competitive business offered industry will hardly fill five plants of the 20 companies which our country encouraged and used in our Korean emergency."

Aviation Distributors and Manufacturers Assn. Elects Officers

New president of the ADMA is Francis L. Hine of Airwork Corp., Millville, N.J. Vice presidents elected are D. H. Hollowell of Continental Motors Corp., Muskegon, Mich., and Paul A. Kennedy, Southwest Airmotive Co., Dallas.

Directors are Harry L. Mitchell of General Aircraft Supply Corp., Detroit, Mich.; George R. Galipeau, Van Dusen Aircraft Supplies, Inc., Teterboro, N.J.; Burns R. Maus, Champion Spark Plug Co., Toledo, O.; W. E. Groves, Pacific Div., Bendix Aviation Corp., North Hollywood, Calif.; and L. L. Clinton, Jr., Denver Airplane Supply Div., Clinton Aviation Corp., Denver, Colo.

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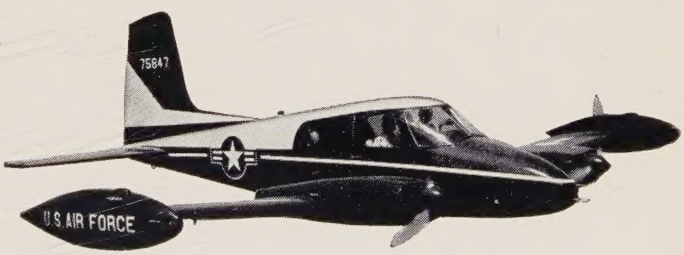

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